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The kitchen project started with a clear-cut goal: to create a clean, simple space. See "Carving Out a Kitchen," page 102. By CHRISTIAN SAND

MAY 2000

features

Bracing for the Big One

A retrofitted foundation fortifies the Santa Barbara project against natural disaster. By MARGIE HANCOCK

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Carving Out a Kitchen

An old garage makes way for an expansive family gathering place. By CHRISTIAN SAND

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Cream in pots, jars, and other containers, almost any place can become a kitchen. By KATHERINE SCHWARTZ

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Poster: Knobs and Pulls

Modern kitchen cabinets offer an average dozen each period-style hardware. By JENNIFER HARRIS

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cover

With the addition of a 1,000-acre plot across from the Main and Diane Robinson's Long Island, New York, home, the first major project for the couple is to see. Among the changes: this new bathroom with a shower tub, off the main master bedroom. Read about the entire renovation in "A Tale of Two Stories," p. 108. PHOTOGRAPH BY ANDREW BARANOVSKI

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RESEARCH DESIGN

Contributors 18 Letters 46 Letter From The Old House 46 Directory 500 Credits
 Proseps Guide 500 To Lathrop 500 Where to Find It 500 Save This Old House 100



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LETTERS



Who's Your Neighbor?

I really enjoy reading TOA and watching the show. I've had the pleasure of meeting Mark and Steve at a home show and Steve at a

stable appearance. I look forward to meeting Rick next! The teacher I enjoy most is Steve. This Old House is a book about what I see it would be to restore much better to its original state. How about an update, with pictures and stories as to what has happened to houses featured?

Gordon Johnson, Danvers, N.J.

Great minds think alike. We're planning to run a tour This Old House update portfolio in our December 1995 issue.

Tub Survey

We missed the boat on your answer to "Save the Tub, Build a Bath" (Ask Alana, March 1994). I find it very hard to get into my tub as I have arthritis. I don't have good balance, and I'm not able to stand long enough to take a shower. I solved my problem with a small ramp-on tub that helps me balance myself while getting in and out of the tub. I also bought a special chair made for bathtubs. It's set in the bottom of the tub. It'd be there for me! My husband installed a handheld shower so I can sit, wash myself, and get out of the tub safely. The small/infant tub cost under \$50, the handheld shower was about \$60, and I got the tub chair at the Salvation Army for \$10. The warranty on my back may have run out, but my knee is still working.

B.L. JOHNSON, SAKAMOTO, B.C. (IN U.S.)

Knowing Norm

Did you have an extra who just arrived from, say, Easter Island with the photo caption for "Shop-stolico," "Outtakes, March 1994" is the right of the photograph of Norm and Normy? It says, "Norm, left, and Normy." Now anyone who has been living in the U.S. for more than a week and who reads your magazine knows who Norm is. The word "left" is an insult to the gender who is never appear in my television.

W.G. [REDACTED] SEAN R. TORRES, KOS.

Be Nice to Basement

Your article "Basement Basics" (March, December 1994) explained how engineered joists are both handy in the environment and easy to work with. This is all true, however, your readers should be aware of some local building codes that would make using these beams a very costly mistake. In my northern suburbs of Chicago, the use of joists are prohibited in an open-vented basement. The codes require a builder to never use exposed joists in basement ceilings with either fire-rated drywall or drop ceiling, or a professionally installed sprinkler system. This code doesn't apply to commercial buildings.

John Smith, Evanston, Ill.

Mining Plans

I was very pleased to find the "Flow Chart" (Power March 1994). It's a clear diagram and would be perfect for beginning design students to learn from. Except for one thing: It's missing a house! In fact, as far as I know, this important component is missing by all nodes, and anybody removing one at the future traps would pay the price for its absence.

Melvin Zuckerman, Princeton, N.J.

Flower traps were once used to prevent mice and rats from creeping—or running—from outside into houses from the sewer. Although a standard code for house traps doesn't exist, many plumbers continue to install them after use of toilet or floor drain predators require them.

punch list

editorial or art editors incorrectly state or containing is as indicated with a correction job.

March 1995

The cover photo the Billerica project, shown inside cover, was built with help from Billerica, Mass. (100,000 sq. ft.)

The cover number for Arlene Isidorov, mentioned as "Tomb Raider" (March 1994), is 400, 100, 100.

In "The House the Day After Tomorrow" on page 60 of "Optimizing 3D with Games," the picture personal area and house of the city is a 100,000 sq. ft. house. The 100 per house data, modified, for the city project, given in the text. The photo is courtesy of Cambridge University.

Addressed to: Editor, TOA (The Official Magazine of the American Society of Home Builders, Inc.) 1000 Independence Ave., Suite 1000, Silver Spring, MD 20910. Attention: Editor's Office. Please include a return address and phone number. Publisher's office at the address may not be open at the time of your letter.

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OUTTAKES

BEHIND THE SCENES AT THIS OLD HOUSE
BY JORDAN REED



Endless Run

UNLOADING THE HALF-BUILDING COPPER GUTTERS FOR THE Santa Barbara project was no one-man job, as seams were shipped in unwieldy 22-foot sections. "Having pieces that one allows for as few joints as possible," explains Agustin Crookeson, the proprietor of Classic Gutter Systems in Kalamazoo, Michigan, which manufactured the lengthy tubes. "That makes installation easier and provides a cleaner look to the finished product." But shipping the goods is not as easy as

the installation. UPS leases packages to suit size, so Classic sends their segments—which can measure 26 feet long—by common carrier. A semi with a 28-foot trailer hauling seams from various businesses picks up the gutters, packed in specially made cardboard crumfs, from the factory, and delivers them in ten days or less. These eternally long gutters also graced the Balboa and Waterman projects, and they've got Tom Silva's stamp of approval: "With all the expansion and contraction that comes with the weather," he says, "The fewer seams you have, the better off you'll be."

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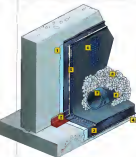
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OUTTAKES



Dry Idea

the Garbage Foundation in Santa Barbara is a complex assemblage of new technology, paper of special resins and asphalt-based plastics that divert water away from the concrete and into a perforated pipe that leads to the carboide gases. For a primer (1) coats the masonry, then a strip of latex concrete (2) fits into the cold joint, a concrete sealant (3) coats the joint, and a self-adhering membrane (4), sealed at the edges with mastic (5). Concrete (6) adheres another membrane (7), making

from heavily polyethylene sandwiched between waterproof sheeting and water-permeable fabric. Finally, perforated pipe on wrapped in landscape fabric *also* lies along the path, balanced in place with gravel backfill. Installer Chuck Hunt says he's used the material in tunnel systems, water cisterns, door flashings, and "anything with a high humidity content." Unfortunately, the material will disintegrate under UV rays, so it can only be installed where it will not see sunlight.

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For 300 years, the world has been divided into two camps: those who believe in the power of the individual and those who believe in the power of the state. The first camp, the individualists, have been the dominant force in the world for most of the last three centuries. They have been the ones who have built the great empires, the great cities, and the great nations. They have been the ones who have created the great works of art, the great literature, and the great science. They have been the ones who have made the world what it is today. But now, the second camp, the statists, are rising. They are the ones who believe that the state is the most important force in the world. They are the ones who believe that the state should control everything. They are the ones who believe that the state should be the source of all power. They are the ones who believe that the state should be the source of all justice. They are the ones who believe that the state should be the source of all life. They are the ones who believe that the state should be the source of all death. They are the ones who believe that the state should be the source of all truth. They are the ones who believe that the state should be the source of all knowledge. They are the ones who believe that the state should be the source of all wisdom. They are the ones who believe that the state should be the source of all power. They are the ones who believe that the state should be the source of all justice. They are the ones who believe that the state should be the source of all life. They are the ones who believe that the state should be the source of all death. They are the ones who believe that the state should be the source of all truth. They are the ones who believe that the state should be the source of all knowledge. They are the ones who believe that the state should be the source of all wisdom.



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HOUSE CALLS WITH STEVE

Gourmet Nook

A 10-square-foot kitchen is outfitted with everything its owner asked for, including a grand restaurant-quality range

In a way, the design—or lack of it—made a remodel of Richard Schwartz's old kitchen easy. There was nothing to be done but to gut it. The 10-foot-by-10-foot space consisted of an enclosure of one metal wall cabinet, a sink on a detached cabinet, and a stove from the 1930s. It didn't even have a refrigerator. And the single window faced an old shabby Schwartz, a professor at the City University of New York Graduate Center, bought the Brooklyn Heights apartment as the wing of his friends and former neighbors, architects Volpe and Richard Cameron. "The building is very lovely, with a very 'communal' feeling, and the apartment was a good deal," he recalls. "I liked its layout and loved the 13-foot-high ceilings and architectural moldings—but it was in terrible shape," he adds. "The Camerons told me they could make it great."

PROBLEM

Schwartz, who is a gourmet cook, knew exactly what he wanted in his kitchen: a restaurant-quality range and refrigerator—and a water sink. His dream space would be on rent and his budget for the job—\$10,000—was tight by New York City standards. He told the architects they could dump on everything else to order to outfit the kitchen with the equipment he desired. "This is a fairly tight kitchen, so fitting in all the big machines an avid cook would need demanded a great deal of imagination," says *The Old House* show host Steve Thomas.



"This is a well-laid-out kitchen, with all the big machines an avid cook would need."

—Steve Thomas



Steve Thomas' kitchen is a cooking dream: a stainless steel double-bowl sink, all-terrain double-bowl sink, all-terrain double-bowl sink, all-terrain double-bowl sink, all-terrain double-bowl sink.

As for style, Schwartz asked for the welcoming intimacy of an Italian country kitchen. Because he didn't want the expense and inconvenience of having to rent a place while the work was being done, the Camerons, along with their partner, Andy Toplin, had to complete the kitchen (as well as other parts of the apartment) during the six-month period that Schwartz was on sabbatical in California.

SOLUTION

"Most cooks would pale at the thought of cramming full meals in such a small space," says Steve of Schwartz's 100-square-foot kitchen. "From a design perspective," he adds, "it means you have to make the most of every square inch." The architects did just that by devising the bulk of the real estate to the range and refriger-

create.



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HOUSE CALLS WITH STEVE

man—then organizing the cabinetry, open shelves, and counter tops around them. “There was so much for a table to sit at, but there was just enough to showcase a nice rack in front of the sink,” says Steve. “It’s a very efficient kitchen, like a galley on a boat, you just have to be sure that the friends you are cooking with know where you’re headed with a hot sauce pot.”

After demolition, electrical, and plumbing, the bulk of the remaining budget went to the range and refrigerator, which means the architect had little to spend on cabinetry. Although they were originally going to use stock units, their contractor said that, since the job required so few cabinets, he could custom make them in his shop—then have them finished with paper rolls and sides, painted



and painted, for about the same price. Wall cabinets were faced with glass doors, to show costs, the architect opted for single pieces of glass rather than divided light.

The fact that the kitchen looked out onto an oak street proved to be a blessing in disguise. When it came time to vote the final required by the range, the architect found that restrictions on altering the exterior of the 100-year-old apartment building didn't apply to the oak shaft, so they could install a vent through the range wall in the already windowed masonry that the co-op's board of directors might reject their plan.

FINISHING TOUCHES

Since the window doesn't look out on any vineyards, the architect brought the charm of Italy into the kitchen with decorative tiles depicting pastoral scenes, which were added within fields of yellow tiles set on the diagonal and framed by natural "spacers," these "pictures," in turn, were dropped into a traditional, plain white ceramic backsplash. "In a room with no natural light, you need places for the eye to rest," says Steve. The floor is covered with 6-inch-square handmade terra cotta tiles, these were installed bone-deep up to highlight their texture, and then sealed several times to withstand any spills. The blue-tinted concrete countertop, made of a high density concrete known as Perma-Quartz, echoes the blue of the river tiles. The white

LEFT: In the new kitchen, each cabinet was given a specific function: to store glass, jars, or (TOP LEFT) 22 small bottles. **RIGHT:** A 20-inch-wide refrigerator and a dishwasher (which sits in under the window), fit into the redesigned space.

marble the durability of granite with the muted beauty of soapstone.

The architect found the chrome specification hardware (and the ceiling lighting fixture) in home products catalogs; the hardware and fixture fit into the scheme perfectly, and, as a result, don't look like afterthoughts. And, they were inexpensive, too. "For a mini-country kitchen," says Steve, "that one little bit. And, in the end, there's no small loss."

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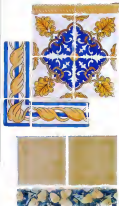
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HOUSE CALLS WITH STEVE

IDEAS NOTEBOOK



tile style

The mile-and-reach approach to creating a backstop is one that is catching on in lynchies across the country. It's the Schwartz kitchen: a field of 4-inch-square white ceramic tiles is ordered by "poured"—



and the other "Wooden Way" the

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How to fix cold crawl spaces, sagging roofs, and ugly concrete walls

X-RATED DRYWALL

The articles about Dick Allen's house this month raise an old question I've had about drywall. Why don't builders use 5/8-inch fire-rated drywall throughout the entire house? I'd certainly pay a premium over standard drywall to have a more fire-resistant structure.

Bruce Mullen, Boston, Mass.

The 5/8-inch, "five-code" drywall (called Type X) increases a wall's fire rating to a minimum of 1 hour, from the 30-minute rating for standard 1/2-inch drywall. And it's not just thickness that makes the difference. Type X has a denser core and contains glass fibers that keep it from crumbling in the heat. But because Type X is slightly more expensive—about 75 cents more per sheet—it's rarely used in residential construction except where the building code requires it—on walls separating an attached garage from the house, and around the boiler in multiple-family dwellings. If you're willing to drill out the corners though, you certainly could use Type X throughout a house, yet it won't necessarily be safer. You'd also have to close off all the other pathways for fire to creep—open doorways, non-fire-rated doors, walls without fire blocking—and that could get costly and look ugly. Type X does have another advantage: It doesn't dump out steam or smoke through the walls. Do you have some?



WORKSOME WINDOWS

The house we recently purchased was built in 1982, and like many of its era, it has a fire door in with a lot but no window. We want to make it a full-height combination, but worry about the window over it. Also, the walls around the lot are thick, but only part way up the wall, and I think the fire door was installed over ordinary drywall. What are our options?

Don E. Brown, Worcester, Mass.

I personally don't like the idea of a window in a doorway—more so if gridded glass on the sill and top into the walls, reaching up midway and over. If the substrate is in fact drywall, it won't be long. You'll have to strip the walls down to the studs (you being, if necessary, while you're at it), cover them with 1/2-inch of board, let the studs

screw on panels of concrete board as a substrate for the sill and the way to the ceiling. That's how thing contractor Joe Farnsworth does it (see "Measure First, Cut Ties," January/February 1998, p. 40). At the time, you could simply block up the window and tile over it. Or you could leave it in place and cover the sill and panels in tile, board, and tile. Better yet, top the sill and board board with a sloped sill of marble. Occasional water spray on the window sill probably won't be a problem, but you could drag a clear shower curtain over it or fit an inside storm pane into the window to protect its wooden parts more completely. And if there isn't an exhaust fan in the bathroom already, be sure to install one.

THE ROLE OF FELT

As I write, new houses being built, I question the logic of some of the construction practices. The rafters, for example, get down rafters being many, many steps. Doesn't that just lead to what should be a water barrier?

David Goss, Birmingham, Ala.

Don't worry about the staples, the felt is going to get punctured even more by the roofing nails. The purpose of felt—a heavy, asphalt-saturated paper—can't be waterproof. It is supposed to protect the sheathing from sunlight and some wind the shingles are installed, keep asphalt shingles from sticking to the roof deck, and offer a modest defense against any water that might someday get past the shingles.

LEAK-FREE SKYLIGHT

Shank Bros. are construction and my wife, so when I retired, I replaced my wood roof with concrete shingles and had a skylight put in at the same time. During one of your shows, you mentioned that a skylight would be an existing roof will eventually leak. But what about a skylight that is made during roof replacement?

Carol Sue Hesse, Boston, Mass.

I'd say your chances of being leak-free are excellent. Installing a skylight into a roof that's all gives you the chance to repair any rot or sheathing damage, and also makes it easy to flash the skylight properly—with any flashing on the sides and angle (per local building code). A little skylight maintenance now and then is a good idea, too. Whenever I clean gutters, I check the upblast side of the skylight and clean

Nov. 28, 1970. Confiscated while passing to girlfriend in study hall.

Valley of the Dolls

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ASK NORM

off accumulations of leaves, dirt, and things that can slow water down long enough to cause trouble.

STUMP TRASH: PAINT OR SEED?

We live in a house [see] that was built in 1907. The siding is wood shingles, and the paint is flaking off in many areas. I know water-blasting isn't a great way to strip paint, but the alternative—chemical stripping or hand scraping—might be more expensive than simply replacing all the siding. I'd appreciate your advice.

Phil G. Wilson, Jr., Brock Hill, S.C.

I'll try to untangle this by starting with the most important fact: 1907? Unless your house has already been stripped down to bare wood, it's covered by layers of once lead-based paint. Or "Got Lead?" March 1999, p. 51! So you're right: that pressure washing, which can pour wood ash and blow loose paint into the air, is absolutely not the way to go. Stripping with heat or chemicals will be slow and expensive, but covering the siding—a tactic we used on the Whitehaven project a couple years back—won't be



cheap, either. I'd suggest that you get at least two bids from lead-removal contractors for removing the paint, and another set of bids from experts for restoring, properly disposing of, and replacing the siding. Whichever method you use, you'll still have to repaint the wood, but with new siding, I highly recommend priming all surfaces of the clapboards below they are sealed up.

FREEZING FLOORS

I am remodeling a cottage built over a dirt subgrade, and in the winter the floors are unacceptably cold. I've insulated the underside of the floor, but there's only about 2 feet of clearance at one end and 10 inches at the other. Could we put rigid insulation between the existing plank floor and new flooring?

Michael Jones Phares, Whitman, Mass.

To make the effort worthwhile, you'll have to try us at least a couple inches of rigid insulation over the old floor and then at least one layer of 1/2-inch plywood to get a base stiff enough for the finish flooring. As a trade, you'd run into one headache

throughout the cottage, you'd have cut the beams off every floor, remove and reinstall all the hardwoods, and covered the trip under the toilet, to mention only a few difficulties. And your floor joists would still be too close to damp dirt, leaving them vulnerable to rot and insects. In other words, your idea sounds like trouble to me.

To solve your problem, you'll first need to confirm the clearance beneath the floor is at least three feet. Have a contractor determine whether it's possible to excavate the crawl space without undermining the foundation. If he can't, you may need to jack up the house. Once that's done, cover the dirt with over-lapping sheets of 6-mil plastic, which will help keep down humidity. Now you'll be able to insulate the floor properly from the underside with rigid sheets of foam, fiberglass bats, or even better, with spray-applied foam.

SENSE DECODING

When Norm Silva built the deck for his brother Dick, [see "Wonder on Deck," November 1999, page 55], he used a Brazilian hardwood called ipé for the decking. I've heard that ipé rotters like termites, but does it get slippery when wet? If so, could it paint it with a non-slip surface?

Walter Banks, Jones, Md.

Tom hasn't noticed any problems on the Billerica deck, he says; it doesn't seem any more slippery than our made-of-pressure-treated wood. And I certainly wouldn't paint it. Why pay for beautiful

wood and then cover it up? Besides, the effort would probably be wasted. "I don't think any paint would stick on ipé because the wood is so dense," Tom says. "We put two coats of teak oil on the deck and they just ran on the surface."

NO WATER CLOSET

I want to build a storage closet in my basement for off-season clothing. The basement sump pump runs continuously during heavy rainfalls until the spring, but only occasionally the rest of the year. How would you recommend I proceed?

William J. Quinn, Southcoast, Mass.

I'd think twice before storing anything valuable in a basement where there's that line of defense against water in an overworked sump pump. For once a risk-averse situation, you should make sure that your gutters and downspouts are moving rainwater away from the house safely. Beyond that, you could upgrade to a sump-toilet drain, but these are expensive solutions, especially if you only have problems part of the year. If you do choose to rely on a sump pump, you should make sure your unit has the capacity to handle anything that Mother Nature dishes out. A 1/2 HP or better sump pump should do the job. You may want a power generator or battery bank in a back-up to keep the pump running if the power goes out. Finally, to protect against dampness and mold, run a dehumidifier in the every season. Your wardrobe will thank you.

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ASK NORM

THRIFTY TO A FAULT

Our old house proved it is not as old as its parts. My grandfather built it in 1948 using lumber and slate roof shingles from a demolished railroad roundhouse, and flooring and tile salvaged from various old houses my uncle tore down. Although Gensco helped build the Paines Court, its apparently didn't understand framing. How else to explain the attic floor joists that go in the wrong direction (parallel to the ridge) over half of the house? Because of this, the house sags considerably. A structural engineer suggested that we not try to strengthen everything, but just stabilize the structure by making the front of the house tie the back. In addition, the roof shingles are breaking apart—Gensco's Yankers think slates allow for rapping nails. Should we tear off the roof and install it with proper framing, venting and insulation, none of which we have now? If so, can the 100-plus-year-old slates be reused?

Danette Stone, Boston, Conn.



Your grandfather was probably trying to get the most out of whatever lumber he had on hand. It's an honorable approach, but he obviously used the material in ways that disadvantaged the house's structural integrity. With no joists to resist the weight of the slates and the outward thrust of the rafters, your walls bulge outward and your roof has a bad case of

sagback. If your budget is tight, I'd defer to the engineer on this one—strengthening bowed walls and a sagging roof is an expensive and complex proposition. If you have the money, though, get your engineer to draft a complex rehabilitation plan and find a contractor who specializes in fixing up old houses. When the time comes to rebuild the roof, it's not a

problem to reuse old shingles, provided they're not crumbling and flaky. An experienced shingle should be able to tell if they're still sound.

LOW-BUDGET DESIGN HELP

Our house has a large concrete slab in the back that's becoming a shed roof. We thought it would be wise to reinforce the slab, but we're not sure exactly what we want done. We did a contractor to do a help us decide what the options are, or should we be talking to an architect?

A. Hoffman, Haverhill, Pa.

When the job is relatively small and your budget is limited, start with a cost estimate. Some are more design-heavy than others, but most will be able to suggest several possibilities, as well as tell you how long the job will take and approximately how much it will cost. Ask for photos of similar jobs they've done, or go take a look at them yourself. Your budget will be a deciding factor in any project, of course. If you're still not satisfied, you could discuss the work with an architectural designer who specializes in residential and small commercial projects. Though they usually aren't trained as extensively as architects, their services are less expensive and they're more likely to take an interest in small remodeling projects.

CONCRETE COSMETICS

We need your advice for remodeling two eyes on our fireplace. We are supposed to remove the fireplace wall around the entry, and a concrete arching wall at one corner of the chimney. We thought about using

the concrete with stone, but were offered by a \$13,000 bid that would have covered about 500 square feet of wall. Are there any other less expensive approaches we should consider?

Chris Barnes, Piquette City, Ohio

Concrete makes a wonderful foundation, but who wants to look at it in its raw form? Around the entryway, I'd simply cover it with siding to match the house—I can't imagine why that wasn't done in the first place. The arch is straightforward; you take precast-treated wood 2x6s and attach them vertically to the concrete, 16 inches apart, using galvanized screws in spacing spacers. Then nail the clapholds to the 2x6s. You should leave at least 8 inches between the clapholds and the ground to protect the wood from splashing water. Plug the opening along the bottom with 6-inch-wide foam insulation to stop insects and other pests from moving in. Also, be sure to prime all surfaces of the siding before installation. As for that concrete chimney wall, you might not want to use precast stone—see tonight's "idea" of a fairly standard thickness—so keep the installation even down. Or you could consider a cover of foam stone made with lightweight, colored concrete. We used one such product at the Santa Barbara project, and it's a dead ringer for the real thing. ■

Special thanks to Norm Abram, The Old House Encyclopedia, and the staff of The Old House Encyclopedia.

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By Dave Brown
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Heady Metal

Stainless steel, zinc, and copper—the signature countertops of serious cooks

BY THOMAS FIELDS-MEYER

U

chen planner Philip L. Rappaport worked as a chef for six years, so when planning his family's new Staten Island, New York, home, he was serious about the cooking space. "I wanted a chef's kitchen," he says, with a commercial range, plenty of map-to-etch worktops, and great work surfaces. "I'm used to working in kitchens that have the right kind of counters," he says, "and that means stainless steel."

Restaurants choose stainless steel for good reasons. It's cleanable, rust-free, easy to clean, and attractive. "You can put a scalding pan directly on the metal," says Randall Seale, a kitchen designer in Kansas City, Missouri. "And for doughs that need a cool

surface, like pastries and dumplings, this is the counter to work on. Best of all, when you're done, you just wipe everything down with soap and water." An alloy of iron, chromium, and nickel, stainless steel is unaffected even by kitchen liquids that react with other metals: lemon juice, vinegar, spaghetti sauce, bleach. About the biggest staining risk is the rust from a wet cast-iron pan or steel wool pad that's left on the counter overnight. And while steel will scratch slightly from everyday use, you can buy it with a random-grain finish that hides the marks.

The cost of stainless steel is on the same ballpark as other premium countertops like marble and granite (roughly \$100 per linear foot plus installation), but it has a dozen advantages: The covering, backsplash, and sink can be integrated into a single seamless unit, similar to solid surfacing such as Corian. There are no grooves or cracked joints where dirt can collect or water can seep through. And metal is friendly to crockery and glassware. "You have to be careful when you or the agent on your guest courses, or you might

PHOTOGRAPHS BY ERIC RAKE



For a kitchen and bathroom that's clean, bright, and easy to maintain, stainless steel work surfaces are the way to go. See Philip Rappaport's kitchen at a professional kitchen show in New York City. A steel countertop is a great choice for a kitchen or bathroom that's clean, bright, and easy to maintain.



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BY SYLVIA DARE

Clearing the Air

Proper ventilation keeps grease and steam out of the kitchen

The thing we try to do with poor design gases, but your wallpaper won't be thanking you. Your work's going to suffer, too! You don't even want to know what it's doing to your clothes." An average family produces over a gallon of airborne grease in their cooking every year," says Karen Collins, a manager at Enviro-Nation, the country's biggest maker of vent hoods. "Now, where do you think that stuff is going?"

Without some sort of ventilation system to whisk it away, all the by-products of cooking—grease, heat, steam, odors, and smoke—will settle on a whomever surfaces they find, turning appliances sticky, eating away at cabinet finishes, and yellowing ceilings and walls. Unfortunately, most building codes around the country don't require kitchen ventilation. And homeowners, if they're given a say, though at all, have been turned off by expensive with-

ing, ineffective, and hard-to-clean hoods. Responding to these complaints, the makers of kitchen range hood product units that are more efficient, quiet, and easy to clean, as well as more stylish.

FACT: A quality of four products enough steam in a poorly cooking to equal 12 gallons of water. It already makes the kitchen—and the room—staying grease—away from cabinets and walls.

he says. Even the makers of these systems admit to their limitations. "If you can't put in a duct, a ductless is better than nothing," says Collins. "But it's better to get the pollutants out."

There are two basic ways to get bad air out: with hoods, which

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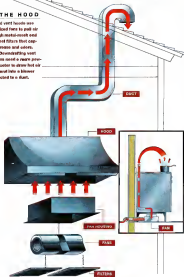
Waynesboro Mississippi Ford Country December 18, 1999

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IN THE HOOD

Ducted vent hoods are motorized fans to pull air through metal-mesh and charcoal filters that capture grease and odors. Some downdraft vent systems need a rear pre-vent filter to draw hot air down and into a blower connected to a duct.



are associated with a range in cooking to draw air up and out, and with downdraft systems, which pull smoke and grease down and out through a vent located at cooktop level. For both types, the duct can run through walls or ceilings or even under the floor. "The shorter the run and the fewer elbows, the better," says Tom. "That's why the ideal setup is a hood mounted right above, and ducted through, an outside wall."

To work properly, a hood should span the entire cooktop, and be installed at the right height—"about 30 to 36 inches off the range

As the stove warms it's sucking up grease, a non-powerful fan can also remove a houseful of air, usually in a duct that runs, such the smoke down a chimney as the exhaust gases from a furnace water heater or a living space. As a rule, kitchen ventilation must go hand in hand with well-ventilated whole-house ventilation. (See "Whole-House Ventilation," ENR 10/26/95, p. 48.)

Kitchen vent hoods work best, of course, when it's left on throughout the cooking process. But many people don't turn it on because of the noise. "Nobody wants to hear a jet engine taking

it's a good rule," says Tom. "You don't want it too low, as you'll be hitting your head. And you don't want it too high, as it won't catch as much grease." Equally important is making sure it has the power to match your usage. A hood's power is measured in CFM (cubic feet per minute), how much you'll need depends on the heat output of your cooking. The best way to calculate the appropriate CFM is to take the burner's rated BTUs, so if every burner were on full tilt, and divide by 100. "In other words, color me according to the worst case," says Ed Gohet, national sales manager for Vent-A-Hood. "During the holidays when you're doing a lot of heavy cooking, you probably will need it."

If the distance between your hood and cooktop is greater than the recommended limit, a higher CFM can compensate. Downdraft systems, which are installed on the very back into a stove or cooktop, can also benefit from additional sucking power since they're battling that law of physics that says hot air rises. However, there is one hard-and-fast rule for how much CFM to add to another one. ZOLIK host Steve Thomas, who co-wrote *The Old Master Kitchen*, opted for the virtually maintenance-free downdraft system in his own kitchen, where the cooktop is in a garage. A day, motorized vent fans 10 inches out of the countertop with the tip of a wrench, but otherwise unnecessary of the way. "It's not as efficient as a hood would be, but it works fine," he says.

A venting system with too much CFM leads to overproblems

all in these kitchens," says Jennifer Capone, board manager for Thermador. Although some low and loads do sound as if they weren't made by Boeing, better made models at low speeds are as quiet as a murmur. To compare noise output, ask for the unit's sound ratings. (See "What's That I Hear?" below.) A handy, computerized noise system can be made quieter by locating the motor, not the roof or an outside on a wall. "It costs more to install, but if it and is an issue, it's worth it," says Capone.

Regardless of which system is installed, it must be cleaned regularly. The worst case is to swap out and go into the deluge, while charcoal filters in ductless models should be replaced periodically according to manufacturer's recommendations. If grease is allowed to build up on filters, it not only reduces a blower's efficiency, it allows more oil to seep into the ductwork, creating a fire hazard. (Tom also once had to replace his entire duct because grease in the ducting caught fire.) Some hoods have no filters at all; they use centrifugal force to swap grease in a housing that's simply wiped clean with a paper towel.

As the costs go up—to more than \$30,000 for solid brass or copper hoods—so do the number of features, accessories, and materials options, including slide-out racks that disappear when not in use, heat lamps and warming shelves, pot and several racks, adjustable

speeds, even sensors that turn the fan on automatically when they sense heat. Ultimately, at a certain price level, hoods are not just about specs in CFM, they're about making a design statement. A streamlined, sculptural shape made of an eye-catching material becomes a dramatic focal point. "High-end hoods still are appeal to the kitchen," says Steve. "Some people imagine them because they're and cooks. Some people would like to know them better they would like to be and cooks, and some people just have them because they look great." So much for cooking grease. ■



Because of its permanent placement in the center of the kitchen, an island vent hood can become a piece of sculpture.

WHAT'S THAT I HEAR?

By the time you've picked a hood, you'll have a good idea of how loud it is, but if you're not sure, where between 60 and 80 and 100 CFM means maximum speed. So what's a sound? "It has no idea," says Steve Thomas, with a laugh. Nor does Tom Ellis. "I don't get into that kind of stuff," he says. Even some people who also have heard that some aren't really that loud. But Dale Plummer, director of the Home Ventilating Institute, an organization that represents manufacturers of ventilation equipment, backs the numbers is designed to tell consumers in comparing how loud noise levels without a calculator. The noise is (noise on a scale of 60, 80, 100, 120, 140, 160, 180, 200, 220, 240, 260, 280, 300, 320, 340, 360, 380, 400, 420, 440, 460, 480, 500, 520, 540, 560, 580, 600, 620, 640, 660, 680, 700, 720, 740, 760, 780, 800, 820, 840, 860, 880, 900, 920, 940, 960, 980, 1000). "It's easy to understand because it's linear," says Plummer. "With decibels, every three decibels doubles your sound." But how loud is the right noise of a typical range hood? "Technically, a noise at 40 decibels at a frequency of 100 hertz pure tone," he says. "The equivalent of a quiet-running refrigerator." If the sound of night refrigerators is a bit hard to imagine, just yourself in front of a window air conditioner on a hot day; you'll hear the whirring sound of one hand sucking.



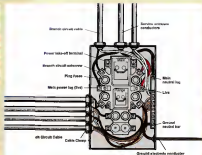
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It has no special museum hours or fee and doesn't charge admission. The Leprosy Memorial Fund was its. When the Jacobs family left the house, they donated it to the fund. The house is now a museum and a place to learn about leprosy.



Viva Victorian
A North Carolina couple
restores a dilapidated 1880s
house to its former glory

When Karen and Pete Naylor's youngest daughter graduated from high school, the family made a trip to Hot Springs, North Carolina, and fell in love with the 600-year-old mansion. "As we crossed the bridge over the river, I felt like I had come home," says Karen. Five days later, they bought a vacation home. Interestingly situated on a 5-acre hillside, the property belied its name: a river valley. Mature oaks and Chinese black walnut trees and a century-old hemlock stand surrounded the grounds. But the house itself was wild. "It looked like a one-story ranch," Karen says, "yet inside, it had 11-foot ceilings and three remarkable places for large windows." Word about the sale of "the old Burnhough place" spread quickly through Hot Springs, and neighbors began inquiring by word of mouth. The original home was three-story brick and stone, with a wrap-around porch and a tower. It was built in 1868 by Colonel James Henry Holcomb.



BY DIANE CONRAD PHOTOGRAPHS BY CHARLES HARRIS

Burnhough, who ran a stagecoach from Greenville, Tennessee, to Greenville, South Carolina. But the building was decrepit in the 1950s, perhaps because it was in danger—though some say it was just old of place. The house's history, and the town's preservation, proved Karen's passion.

"The kids were off to college," says Karen. "And after all the years that I had dreamed of my career as a mom, it was time for me to do something else. So I decided to become a restaurateur and an entrepreneur." She planned to reconstruct the building as an original three-story house, then run it as a bed and breakfast, while Pete continued working and living in Charlotte and commuting to Hot Springs to help out on weekends. "In a few years, Pete would take an early retirement. By then I would have the business, and we could run it together," Karen explains.

They began restoring local crafts items to restore the interior. Pete even hand the clock as a favorite local restaurateur.



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start to be a laborer on the job through the winter months. Meanwhile, Kahan interviewed architects to design the addition, selecting Jose Guarcia-Mathews, of Mathews & Glaser Architects, in Asheville. "This project was intriguing, because you could see vestiges of the somewhat late-Victorian beauty that had been there," says Mathews, an expert in historic preservation. "And our mission was to renovate and preserve that beauty."

Since no architectural drawings of the original house existed, Mathews spent two months doing detective work, scrutinizing old photographs with a magnifying glass to figure out rooflines and porch configurations. By studying the proportions in the pictures and comparing those to measurements of similar houses, he determined the size of windows, the pitch of the roof, and the height of the tower. In the end, Mathews located the old fireplaces on the chimneys. They had been filled in with bricks and concrete when the house and its chimneys were fireproofed, but outlined the locations and sizes of original fireplaces. The attic joists provided evidence of the locations of second-floor beams as well. And the down on the second floor as the first entrance indicated where the stairway had been.

The first step of the project was to remove the roof in order to add the upper stories. But that threatened the porous plaster ornaments on the first-floor ceilings. "No matter how careful you are when you do second-story additions, there's always the potential for leaks, especially in a wet mountain winter," says Mathews. "With the plasterwork in this house, that was not a risk we could take," so Pree began looking for a way to prevent it during construction.

At first he thought a large pump into engine work, but soon learned that if pumped that high up, it would fly away in the wind. "I looked into everything from turps to aerosol hangers," says Pree. "I found the answer in a giant plastic bubble that's kept inflated by powerful fans. 'A tropical paradise in Florida began building the bubbles for his church meetings,' says Pree. "Now he sells them for all sorts of uses, like the humidity tent for the Atlanta Olympics." The giant half-sphere looked like a big globe towering over the single-story house.

The bubble stayed there for five months while general contractor Rick Kahan constructed the addition. He took off the roof, then

built a structural platform over the first-floor ceiling to hold the upper stories. The old joists would not have been able to absorb the weight, he says, and if they did, the plaster moldings hanging on the ceiling underneath them could have crumbled. "The joists were just 2x10s, which spanned 15 feet in some places," Kahan says. "They would have bowed under the weight." So, he built a new framework on top of them using laminated-wooder lumber, plywood-like beams that reinforced the weight of the addition to the bearing walls. Over that, he framed the new walls, floors, and roof, which included three gables plus the mansard roof on the tower. Once the roofing and windows had sealed the building, the bubble was removed—an overhang which drew a crowd of onlookers who were seeing the re-created building for the first time.

Next, Kahan turned his focus on the porches and laid out deep-board, saw flange-jointed redwood trim, and gingerbread porches. "We looked at the porch railing in the original picture," he says. "Then we sketched the design and Rick re-created it in his own



Top left: The finished porch resembled a carriage's balcony, with the deep-board trim set in from the plaster. Top right: With the siding in place, Kahan lifted the deflated sheet off the house. Bottom left: An Allen pipe clamp kept the weight from the roof and Pree's Nighthawk helped to lift it. Bottom right: The finished porch.

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shop on the garage." Kallias used a 3-inch plywood template to trace the design onto 3-inch marine plywood, then cut a segment of a scroll saw and jig-saw. The exterior was true to the original house, but not an exact replica. The many roof dormers in the 1880s photos were deemed too expensive to re-create.

While Kallias focused on the exterior, Pete's crew was mostly, painstakingly making the interior look as if it were original. Floor plans, moldings, fireplace, windows, and stairways were all designed based on the historic documentation. Carpenter duplicated the unique staircase floor on the upstairs landing, with alternating walnut and pine boards. For the wide plank floors in the rest of the addition, "we chose Number 2 pine which has lots of knots and imperfections," says Pete. "That we worked really hard on the stairs to match the dark fir in the color." Master's restored ceiling moldings and crown moldings on the first floor using varnished as models. Upstairs, they installed the crown with wood because raising of plaster moldings was prohibitively expensive.

Pete even negotiated for the return of a feature that had been removed when the house was shopped up in the late 1950s—the original newel post for the end of the staircase. The hand-carved pine stood in a neighbor's basement. "So, I went down there," explains Pete, "we drank a beer and I told him that I'd be willing to pay some money, plus build him a replacement post, if we could get one to use in our house." They struck a deal.



TOP: Workers stripped dozens of layers of paint from plaster columns to redecorate their detail. **Bottom:** Some of the original and newly installed moldings were missing from the interior (top) and moldings (bottom) on replacement stairs were used from broken pieces found on the site, salvaged to place new and old pieces together. **RIGHT:** Pete's crew used the same pine floor on the stairs. **Bottom:** The newel post looks as if it were original, but it's a replica.

my job, the only thing to do was put the pedal to the metal and keep going." The Nagles finished the project, then got serious about making the art financially viable. "The payoff was really a blessing," Karen says. "It forced us to do what we were scared to do—develop ourselves to the max. Plus we got to be together, rather than having a weekend marriage."

After 18 months of construction, the old Rumbough house had regained its ancient as a grand Victorian mansion. The Nagles immediately embarked on a job offer to one of the contractors—the chef who was moonlighting as a carpenter now runs the kitchen. In no time, the new gas-coast Mosca's Magnolia Inn housed nearly 2,000 guests and 12 weddings. "There was a time when we couldn't see the light at the end of the tunnel with all the debt in a Victorian house," Pete says. "But now we're thankful for every careful effort the whole crew put into this project. And our old Charleston friends, who said we were crazy to do this, can't get enough of this place." ■



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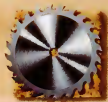
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Move or Improve?

A growing family: An undersized house
How to assess your options



W

BY MAGGIE MANAR

When Mary and Andrew Sengren built their Colonial-style home in Hingham, Massachusetts, seven years ago, they told the contractor they wanted a two-story foyer with a large window. It didn't occur to them to ask for a mudroom with a side door off the porch. In other words, they didn't yet have children.

"Now, we could start low about the foyer," Mary explains. But with two children under eight, the current side entrance "with a big walk-in closet for the kids' shoes, hats, and coats." She also suspects that their four bedrooms haven't become a big wing as their family grows. "The extra bedroom is really small," says Mary. "It's not really even suitable for a guest suite—unless you want to discourage visitors."

But the Sengrens need more than a one-room addition. "We have one two full bathrooms," Mary points out. "We'd like a third." Add a din, plus a room over the garage—the cost really

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clinks to \$50,000. "And we're not at all sure that we would be adding \$100,000 to the value of the house," Jeleny cautions. "That's what the idea starts chewing at your head—maybe we should move instead."

The Sengrups face a common dilemma: move or improve? Upgrading a family is a traumatic, but ensuring a home can be just as stressful. If they move, Mary worries about her son going to a new school. "We love our location," she confesses. "Our house suits a community, and we know all of the kids on the block. You don't attach." It's an emotional decision. That's why it can be a good idea to step back, clear your head, and compare the financial costs. The numbers can be confusing, compelling, in fact, that they may swing the decision.

If, like the Sengrups, you're attached to your house, a renovation is usually the first option you'll consider. To determine the price of the job, make a list of the improvements you want, room by room. Don't forget the details, towel bars, faucets, and showerheads add up. Then solicit bids from three contractors, asking them to break down their esti-

mates by room to simplify matters if you decide to share your plans later. When the bids come in, add 10 to 15 percent for the architect fees, and you'll have a rough idea of what your upgrade will cost.

If the price seems steep, remember that this is one of the very few choices you'll ever have to turn a profit tax-free. Invest \$20,000 in a high-flying Internet stock, watch the share price double, sell it for \$40,000 and you'll walk away at least 20 percent in capital gains taxes. For the same \$20,000 into improving a \$150,000 house, sell it for \$170,000, and you owe no tax on the gain. Homeowners say they allowed a tax-free profit of \$250,000 (\$599,000 if they're married) each time they sell.

Renovating can be incredibly lucrative, so long as you avoid the most common mistake, "over-improving." Appraisers say that too often, homeowners put more money into a home than the block can support. "Neighborhoods are tiered," explains Richard Newberg, of Appraisals Unlimited in Brookline, Massachusetts. "In one area, houses sell for \$130,000 to \$200,000; in another, they start at

MONEYCLIP

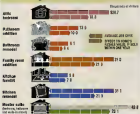
Home Improvement

For the biggest return for your remodeling budget when you sell the house, look to the heart of the home. "An updated kitchen," says Bryan Fishelson of the National Association of Home Builders, "usually increases the house's value more than any other improvement."

But don't mistake it as a panacea for the seller. "Trying to predict what a buyer will want is risky business," Fishelson warns. "Underwrite an improvement project only if you're planning to enjoy it for a while." Then if you sell, say, three to six years later, you've already "grilled" by using the remodeled space, and you're likely to make a little money too—assuming the real estate market is strong and your remodeling choices haven't gone out of fashion.

"If you're looking for the best short-term investment at just before selling, take care of maintenance and repairs, or do a little simple decorating," advises Fishelson. According to a 1999 survey of real estate agents, a kitchen facelift—in a paint or wallpaper, lighting, and countertops—returned nearly 60 percent of the cost after just one year. By comparison, major remodeling projects—like a complete kitchen overhaul—returned only about 70 percent. —Gerry Devlin

Remodeling Costs and Returns



Average costs in 1997 for remodels and remodeling increases in home resale value a year later—and the result of good planning, but a combination of companies. Source: Remodeling magazine 1999 Cost vs. Value Report.



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\$200,000 and top off at around \$250,000 to \$275,000. Just if a \$30,000 kitchen is a \$100,000 home on a \$100,000 block, and when it comes time to sell, you won't get your money back," Newberg warns. "If you're near the top of your market, you can't show yourself into another market, or market what you do. Buyers willing to pay that much for a kitchen are looking at a million dollars for homes in other neighborhoods." Increasing the square footage of the house might not pay you back either, warns Rob D'Andrea of Capital Appraisal in Frederick, Maryland. "I remember evaluating a wonderful house in Baltimore," says D'Andrea. "The owner had almost doubled its size, but these homes weren't the norm in his area and he didn't get more money for the larger house. He might better have put his money into buying a larger house in a superior neighborhood."

Of course, if you plan to stay in your home for, say, 10 years, you don't need to worry so much about piling the life. The use and pleasure you derive from your dream kitchen may justify the cost. But if you're not likely to live in the house long, "you're probably better off using the money to move to the bottom end of a better neighborhood," advises D'Andrea.

On that score, the scales tip in favor of moving to a new house. But negotiating a post-neighborhood move securing a post mortgage. And that decision is complicated when mortgage rates are rising. Moving might mean giving up a low interest rate for a higher one. Assume a couple has a 7 percent mortgage on \$200,000, a 9 percent loan on exactly the same amount would cost another \$4,000 a year. If they took a variable rate mortgage and rates continue to climb, the difference could be quite substantial. (An easy way to run the numbers for a variety of possible scenarios is to use a Web mortgage calculator like the one at money.com.)

In the Semper's case, interest rates hovered under 8 percent when they decided they might want to build a new house but fell by early February, when had climbed to 9 percent. Since the Semper's plan to take a \$400,000 construction loan, the difference between 8 percent and 9 percent will have cost \$100,000 by the end of the 30-year term. "And the mortgage we're cur-

rying now is only 7.5 percent fixed," Mary laments. Yet even these numbers can overstate the expense. It's not likely that the Semper's will actually stay in their new home for decades. Assuming they move sooner, they'll wind up paying just an extra \$3,402 annually, and the loan's share of those early payments will be non-deferred interest. In a 34 percent tax bracket, that translates into less than \$1,500 a year.

So while a mortgage may cost less than it appears, transaction costs always add up as more than other buyers or sellers expect. Title insurance, an attorney, a home inspection, the builder's attorney—when you buy, these firms add 5 to 6 percent to the cost. When you sell, the price of a survey, your attorney, the broker's fee, plus any transfer taxes charged by your city or state can thin your selling price by as much as 10 percent. Are these high costs of getting "in and out" that can eat the potential profits of a real-estate deal, pushing the move into costly?

In the end, the decision to make your house or make over your life is a matter of choice, and doesn't hang solely on money. As of mid-February the Semper's were still debating. "We'll see the plans for the new house next week, and we'll have to make a decision by the end of the month. We still don't know what we're going to do," Mary says. "Sometimes, I wish the house we are in just would just fall down so that we could rebuild right here." ■

PHOTO: GETTY IMAGES/DAVID J. PHILLIPS

HOW MUCH IS THAT PER MONTH?

With the existing but real estate market in metropolitan areas like over the past few years, shoppers have to be prepared to jump quickly when they see the right house. It helps to know how to do some mortgage math in your head. Try this simple trick for estimating ballpark monthly costs:

You probably already know about how much cash you have to spend (\$100,000, for example) to start about 5 to 8 percent of the house's price (say, \$15,000) to pay for closing costs, and you have your down payment amount (about \$100,000).

Subtract the down payment from the house's price (\$200,000, for example) and you know what you need to borrow (\$100,000). Knock those zeros off the end of that figure (100).

Next, take the house rate into a dollar figure—converting 8 percent into 80, for instance. Then multiply 80 by 100 and you have a rough estimate of your monthly loan payment (\$8,000).

To add property taxes into the equation, you'll need a calculator and some information from the seller's last sheet.

Multiply the property tax percentage (say, 3 percent) by the assessed value of the house (perhaps \$200,000) and divide by 12 (monthly payments). Add a \$200,000 x .03 x 12 = \$2,400 per month. Add in insurance (typically \$50 to \$100 per month) and you have a pretty good idea of what that new house will cost each month, about \$1,270 in our example. —Josh Gardner

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A Sense of History

From refurbished stoves to vintage-style hardware—products and ideas to build a period look into a renovated kitchen

O

wners of old houses love to talk about preservation. But you rarely hear talk about a vintage kitchen faithfully restored to its former glory. The historic houses we love, with their thick walls, arched windows, and architectural flourishes, did not have the kinds of kitchens we expect today. Historic kitchens are antiquated kitchens, inefficient and poorly laid out for modern-day needs. In a typical prewar model, everything was haphazard: the hearth at the end of a stove, the sink on porcelain legs, the cupboard, a table that doubled as a work surface, a stepback cupboard to store the dishes—if there was no better's pantry. Kitchens were work areas, plain and simple. And those modernized in the 1950s, '60s, or '70s often held even less appeal than their forebears: The countertop, flooring, and ceiling materials in them were usually as attractive as the hardwoods, linoleums, and metals they replaced. Appliances came in dismal hues: the avocado and harvest golds that, for good reason, have never returned to favor.

Today we want to capture the flavor of the kitchens we imagine our great-grandparents loved: Homely, warm. And filled with the aroma of good cooking. Fortunately, replicating the mood of a vintage kitchen, as an eating space or as an old-on, has never been easier. As demand for kitchen design with a patina of age has grown, so has the availability of period materials, architectural salvages, and well-designed reproduction hardware and appliances. Resources for old-fashioned pieces can be found by perusing advertisements in many home-design magazines, acquiring at local antique shops and architectural salvage companies, and browsing the Web.

STORAGE SOLUTIONS

A major concern for most modern-day households is storage. Kitchens of yore may have offered little storage in the work area itself, but larger houses usually had a separate walk-in pantry, a butler's pantry, and, in very old houses, a butler's wine cellar, spice, and preserves would be kept. The strict allocation of rooms to be stored in a smart way to think of how and where



A number of historic work to create an Arts and Crafts flavor in this newly renovated kitchen: a wall-hung plate rack with open shelving on brackets, a farmhouse-style sink and covertop made from stone, green glass pendant lights, and hand-made maple drawer pulls.

BY TERRY TREDSO

PHOTOGRAPH BY ANDRE BARANOWSKI

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to position cabinetry—either in the kitchen itself or in an adjoining space, such as a pantry.

Cabinets, more than any other single element in the design, determine the look of a kitchen. To give a kitchen a historic feeling, architects and designers caution against filling the kitchen with modern built-ins; rather, they advocate an “unfinished” look, a mix of pieces with different finishes. Architectural salvage companies, such as Urban Archaeology in New York City, and Architectural Antique Exchange in Philadelphia, often stock vintage cabinets in wood or metal, which can well with free-standing antiques or reproduction pieces, such as a Welsh dresser or a dry sink, and with semi-customized units like glass racks and open shelving. Painted wood cabinets may warp when stripped, so you might want to try one cabinet door first. Metal cabinets should be stripped, buffed, and lacquered to prevent them from rusting.

If you decide to go with all-new cabinetry, be aware of the significant design elements of the era you are trying to recall when you make your selection. Kitchens built between 1840 and 1930, for example, often featured Shaker-style cabinets, with plain, box-

frame panels (and no legs on the doors). Some designers who value authenticity over comfort specify base cabinets that go straight to the floor, for an compromise by installing scrapple-base cabinets for storage or display and cabinets with a toe kick in work areas.

SURFACES TO CONSIDER

Stone countertops are compatible with old-fashioned kitchens—as long as the stone is honed to a soft finish. Vermont soapstone is one popular choice. Granite, subtly colored or left in a granite look, is a contemporary alternative to a natural material, concrete a durable no-long-as-it-is-tooled.

For flooring, architects and designers usually recommend hardwood. Laminates, available for years, is making a comeback. Imperfect materials, including linoleum tiles, have never been more beautiful or practical. Colors and patterns range from pale, marble-like designs to intense, broad-brushed, high-contrast motifs. Shaded rolls of vintage linoleum from the 1930s to the '80s can often be found at vintage companies or at specialty stores like See-Nothing Store in New York City.

Many homeowners today want to simulate the look of their great-grandparents' kitchens.

You can also install a mosaic tile floor, which takes its inspiration from kitchens dating from the 1520s through the '60s, particularly black- or gray-and-white checkboard or basketweave configurations, or all-white homophony, “diamond mesh” designs. Use white grout for historical accuracy; gray grout, a popular choice today, shows its age.

On the ceiling, painted metal is handsome, particularly when left in its natural state. As an alternative, try heavy Acapulco-type paper, a cream-colored wallpaper embossed in a variety of wood patterns. It is less expensive to install than painted metal and, once painted, achieves a similar effect.

LIGHTING EFFECTS

Even though they were not used in old houses, most designers recommend under-cabinet lights because they provide discreet but effective task lighting. Vintage-style ball-and-jug and chandelier lights have a period appeal when hung over islands or traditional butcher-block or brass-tissue cabinet back walls as well, especially in a cozy dining alcove.

OLD STOVES, NEW ROOFS

Feuding antiques and looking stoves—and, occasionally, refrigerators—became scarce in the mid-1920s, when the country look was disappearing. Howland and Bensen, two Canadian companies,

make new stoves that simulate the look of our grandparent's—complete with porcelain Queen Anne legs, warming ovens, tall backs, and lots of chrome. Generic old gas stoves are available from a number of sources, such as Antique Home Stores in Los Angeles. The store, which ships, usually has a stock of “90s Magic Cooks, among others, on hand. All stoves are refurbished and come fixed so you don't need to light a match every time you heat it on. Though most old stoves are white, some occasionally turn up in cream, green, or black.

Hoods are another story. Since they weren't around 180 years ago, it can be difficult to find one that will blend with a refurbished stove. The most common approach is to for the hood of your choice in wood and integrate it into the upper cabinetry. A metal hood should be custom designed to complement the range over which it hangs. Or install a removable downdraft hood, when not in use, it almost seems to disappear.

HARDWARE, THE FINISHING TOUCH

Vintage-style hardware, whether old or reproduced, adds finishing touch—usually for the period look kitchen. But pulls are one popular choice. Make sure the finish is authentic. Designers suggest oil-washed brass, antique brass, and satin nickel. Or try a blackened finish. As our designer says, the hardware will look as if it's been there for many years. Just like your kitchen. ■

PHOTOS BY JANE E. AND KENNETH — PAGE 100

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Corky and easy underfoot, legions of kids, dogs, and dump-cyclists (or mblards, a cliché to cheer Cork in the perfect footwear. "It's hot," says Peter Colburn, who sells a variety of materials for floors at the HomeCentral Home Center in Seattle, but chalks up small cork in his own kitchen and living room. "It's a beautiful material. And because of the softer surface, you can even drop a wine glass and it might not break."

Cork is also easy to love because it's environmentally friendly. Made from the thick spongy bark of the cork oak, *Quercus suber*, which grows in the arid reaches of Portugal, Spain, Morocco, and Algeria, cork is a completely natural, renewable resource. Harvesters simply peel

BY JEANNE HUBER

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the bark off its thick skin, taking care not to damage the living tissue underneath. Then over the next one to two years, the tree grows a new skin thick enough to repeat the harvesting process. As an environmental bonus, the cork industry helps preserve forest cover in nearly 3.5 million acres that would otherwise become deserts. Portugal, the producer of half the world's cork, tightly regulates harvesting schedules and has made it illegal since the 1930s to cut down cork-producing trees.

The harvested pieces are cleaned, boiled, and stripped of their rough outer surface. What corks, the most portable product, are bound into floor, leaving the slabs looking like pieces of Swiss cheese. Some of the scraps are ground into granules and sold as insulation; others are used for shoe cushioning and as animal accessories. Most of the leftovers, though, become flooring.

To produce the various patterns and shapes of floor covering, manufacturers take cork crumbles and mix in a small amount of glue, then compact the cork into 3-foot square blocks, from which tiles or sheets are cut. By varying the ratio of cork to glue, makers produce different hues, some light as straw, others as dark as walnut.

Cork flooring is cork dust-free and springs because of its irregular structure. It's packed into a honeycomb of air cells, compression, 16-sided cells—approximately 90 million of them per cubic centimeter—that have air inlets at the walls of flexible walls. When you step on cork, the air in the inlets is squeezed out and then returns, then springs back when released.

In the 1920s and '30s, cork floors became popular for both homes and businesses. Steve Keno, a sales representative for Kolbe and Kolbe,



Harvesting in Portugal peels away a giant slice of cork-bark bark while avoiding damage to the wood of the underlying tree.

perfectly smooth to any surface underneath, much to be envied through the thin squares. Then the tiles are laid one by one onto a mass of crushed cork or a subfloor. The thicker planks, which are actually tongue-and-groove medium-density fiberboard with

attached between layers of cork, are glued together to the edges instead of allowed to be underlaid, so the entire floor "floats." "There's no way to install it's almost laughable," says Colburn, who claims planks to cover old wooden flooring.

Both styles come either bare or prefinished. Acrylic, more recently introduced as a coating for cork, requires the same frequent renewal—as often as once every four to six months. But applying a new coat is easy: Just step on it. Polyurethane lasts longest, but when it eventually wears through in those 10 years or so, the old finish must be thoroughly sanded to ensure the new coat will stick. The final choice is old-fashioned cranberry wax, mixed in commercial finishes with oil. Although wax requires reapplying once a year, Colburn chose it for his floor. "It feels really nice next to bare skin," he says. ■



Cork tiles need smooth, even underlayment, which sometimes requires expensive prep work by a contractor. To install, tiles are set into grooves sanded over concrete (left) or plywood and then rolled with a 100-pound weight (right) to ensure a tight bond.

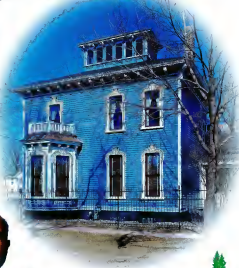


based in Angers, Georgia, guesses that cork was second only to hardwood as a flooring choice during that time. But in the mid-1990s, cork fell out of favor, pushed aside by wall-to-wall carpeting and by cork's need to be sealed by hand, an annual chore. Early experiments with vinyl coverings didn't work, Keno says, then in the late 1970s, some factories introduced an easy-to-install polyurethane finish that holds in, and flexes with, cork. A new generation of flooring was on its way.

Today, the options include tiles, sold in 36-inch-by-36-inch one-foot squares, and laminated 36-inch-by-36-inch planks, 1 foot wide and 3 feet long. Both types start at about \$4 a square foot, but tile is the most expensive to install. First, the concrete or plywood subfloor has to be

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TALKING SHOP

Now We're Cookin'

Microwaves were treated in quite a few time-savers when they were introduced in the mid-1960s. And while these bulky beasts have gotten smaller over the years and have become fixtures in the American kitchen, they're used mostly for defrosting and reheating. "Microwaves are fast," says Eve Felder, associate dean at the Culinary Institute of America, "but they don't caramelize food, which is what causes browning." Now, one manufacturer is offering an oven that combines microwave speed with the cooking efficiency of convection and broiling systems, affording better sear to a fast-cooked meat. The convection oven has also evolved: A new sauge-d-up version channels hot air directly at food, reducing cook times by up to 75 percent. Yet not all innovative cookers are in such a hurry—slow-braising can enhance the flavor of a dish. New steam ovens prevent food from drying out by humidifying the cooking chamber, and at-home wood-burning ovens impart a smoky flavor to everything from chicken to pizza. With so many options, choosing the oven for a new kitchen might be even harder than deciding what to serve at a dinner party.

2477 ThermaChef's JetDirect improves the convection oven. It speeds up cooking by blowing hot air directly toward the food, and it automatically converts standard-oven cooking times to its much quicker pace. **1600P** Anyday's microwaves, convection, and quartz heat is varying amounts depending on the food. The **Whisper QuietCook** produces a fully baked potato in 12 minutes and a tender 60-pound chicken in an hour.



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PHOTO: MICHAEL GOODMAN



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Good Books

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Hip Chip

On the job site, or off, portable MP3 players deliver CD-quality sound without the skips

BY JOHN FRIED

W

hen the compact disc came along 16 years ago, its clear, crisp digital sound and unerring fidelity instantly turned my record player and digi-wind albums into museum relics. I figured that recording technology had pretty much reached the pinnacle of sophistication. Well, the digital revolution that transfigured every other facet of our lives has created new devices that may render CDs obsolete and make your Walkman go the way of the 8-track.

Cards (or condems) MP3, a digital audio format that compresses music onto less space than a microcassette on a CD with no loss of sound quality. Developed in 1990 by a German consortium (the Motion Picture Experts Group Audio Layer 3, in case anyone wants to know), MP3 quickly became popular among college kids and rebels looking for an efficient way to hoarding music off CDs and push it around over the Internet. Such free exchange was made possible because MP3, unlike computer software, is an open format, so songs can be copied endlessly without regard for copyright laws. Not surprisingly, this made MP3 a dirty word among record industry executives. For many of us, though, listening to music on a computer is on par with watching



Sony's ICF-MW6 MP3 player stores up to 40 minutes of CD-quality audio on its ultra-compact 32MB flash memory card.

Lawrence of Arabia on a 53-inch black-and-white TV.

That all changed in November 1999 with the release of the first portable digital music players. These disk-pocket-size devices, commonly called MP3 players, are a hybrid of a cassette recorder and a portable CD. You can record songs and get high-fidelity music that can be taken and played anywhere. But instead of spooling a tape or spinning a disc, MP3 players store music on built-in memory chips or removable, credit-card-sized or flash-memory cards. These cards are made of giant size pieces of plastic are capable of holding up to 65 megabytes (MB) of digital data. As a rule of thumb, one minute of music consumes about 1MB of memory, so you get about an hour of listening time per card. (It's possible to cram in more, but you'll sacrifice quality.)

The biggest gripe with features of MP3 players is that they have no moving parts (other than solid state), so they will never skip or flutter. That makes them ideal for a jog in the park or a fix to work out, where a scratched CD player often skips in time with your heart. Surprisingly, though, there are only three

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The 2.5-ounce *Music Clip* offers one hour of digital audio, four hours of dictation, and for extra fees, a built-in FM receiver.

models that come with a clip—Dunwood Multimedia's *Blue 200* (\$169), and Sony's new *Music Clip* (\$299). And they run up power. A typical player can run for 10 or more hours on a single AA battery.

To load music into a player, you need a PC with a CD drive and 64MB of RAM or more. (Only the *Blue* and *Music Clip*.) Once you've hooked the player up to your computer with the cable provided, there are two basic ways to copy a song, either from the computer's CD drive or via the Internet. In the first scenario, you just slip one of your own CDs into the computer and convert the music into the MP3 format, using software that comes with the player. That's a simple matter to transfer the audio from the computer into the portable unit. Converting *Wings* Macarena's three-minute song "Brown Eyed Girl," for instance, can be done in less than a minute, transferring the song from the computer takes a few seconds. You can load a player with approximately 15 songs at about six hours. The second method involves downloading music from Web sites such as MP3.com and *Lyric.com* onto your computer, and then transferring it to the player as above. The speed of the download depends on the speed of your modem. Mine is a suspiciously 56K, and downloads often take twice as long as the song itself.

There are about three dozen models of MP3 players. The reigning king, the *Blue 200*, is roughly the size of a deck of cards and features 64MB of built-in memory plus a slot for adding an additional 64MB (S16) or 32MB card (S18). Other players offer FM receivers, clocks, and built-in



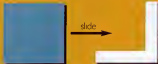
address books, as well as the ability to store voice recordings. But Sony's release of its *Memory Stick Player* (\$299) in January gives MP3 its latest twist: Slightly larger than a laptop case, Sony's player stores music on removable 4-MB cards called *Memory Sticks*, which also fit in Sony digital cameras and recorders. With every compact-to-player transfer, the *Memory Stick* automatically converts the music to *ATRAC3*, a licensed format that prevents any further duplication, and less sound-quality sacrifices sleep soundly at night.

As you search the Web for music, you will quickly discover that MP3 is not the only digital audio format available. Some other formats such as *Tagged Audio* and *Duffy Digital* even offer protection against end less copying. The problem is that these formats are not interchangeable and no one player can access them all. My Sony, for instance, can't play Microsoft's *Windows Media Audio* tracks. While there is talk of an industry standard and new software that will enable players to tap into multiple formats, nothing has happened yet, leaving MP3 the de facto standard.

Currently, most class 1 and class 2 digital music players have been sold, and most of them are MP3 compatible. The market is expected to increase 52-fold in the next three years. You can get MP3 players for cars and software that turns your palm-top organizer into a digital player. But until manufacturers arrive at a standard that allows MP3 devices to access all the music on the Web, they will remain more of a complement to your current CD player, better suited to use in the gym than as mobile equipment for serious listening. ■

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Fresh Faced

A new finish gives a porcelain tub a second life

BY RICHARD WEIN



Reinforced in a new paint, Scott's new acrylic is applied over the tub's damaged porcelain. He protects the tub's new finish with a clear acrylic top coat.

When moving out my current apartment, I was immediately drawn to the ancient bathtub—a real beauty from 1910 when bathing was a ritual and showers described rain. But my cleaner quickly discovered I had the real gally along its bottom, the work of a persistent leak that had cracked the white porcelain and exposed the tub's core iron shell. The building's super promised to fix it—and fix it he did, by slipping on some latex paint that I'd call off every time I walked in for a warm bath.

The super's methods were suspect, but he was essentially on the right track in trying to save the tub by resurfacing its surface. "People very often try to save old tubs because they're slightly blighted," says Richard Terhewy, TO H, plumbing and heating expert. "But it's not easy to find an affordable bathtub with the look and size of a period tub." Each year refinishing shops across the country rescue thousands of old and old tubs and sinks by stripping an acrylic surface from coating. Done correctly, either off-site in a shop or in place, refinishing is an effective and inexpensive solution for porcelain that is chipped, worn rough, or whose color has simply gone out of style. For an

average cost of \$150 to \$300—a fraction of the \$2,000 to \$5,000 expense of a new cast-iron or steel tub propped—refinishers can make an antique fixture look brand new. "Professional refinishing can be a cost-effective solution for that retro look," Terhewy says.

That's what Jackie Matropoulos chose to do, and hired Scott Agers, a technician for the Miracle Method franchise in Lowell, Massachusetts, to refurbish the old cast-iron bathtub in the 1929 house she and her husband, Mike, own in Longmeadow, Mass. Their second-floor bathroom has a mix of old charm and new ideas, but the so-called tub looks and feels abandoned, with a green water mark under the faucet, several rusty drips on the lip, and a dull, gray scum from years of soap scum.

To prepare for refinishing, Agers first covers a wire the coils between the tub and the walls and floor with a putty knife, then removes the drain cover and masks off the faucet. The edge of the coating will be hidden behind the drilled fixtures and a new head of coils. Next he cleans the tub to remove the impurities that can hinder adhesion of the new finish. He scrapes off soap scum



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Apex, a former auto-body repairman, refinished tubs using many of the same techniques he uses sand on fenders. He fills deep nail scratches with putty (left) and then the finished product (right) with a power buffer (center). Before spraying, there applies a thin bonding agent over the tub's water surface. A necessary step is remove that the same finish won't peel off the old porcelain.

with a scum blade, then wipe on an alkaline etcher commonly used to prep waxed-off floors. He follows with an acid-based caustic cleanser that neutralizes the etcher, and after rinsing and drying the tub, rubs it clean with denatured alcohol.

Again, a former auto-body repairman, scratch fiberglass putty and deep dings and scratches, just as he would on a damaged car door (Had the tub been severely scratched by cleaning with bleach, he would have had to prep the entire water surface.) After the fiberglass hardens, he sands it with a coarse 36-grit paper to knock down high spots and an 80-grit paper to flatten it out. He fills any potholes in the dried fiberglass with a polyester glassing putty, waits for it to set, then sands it in the same direction.

After wiping with a tack cloth, he taps on a bonding agent that enables the acrylic urethane enamel to adhere to the porcelain's glasslike surface. Minnie refinishes first roughens up the tub's surface by brushing on a solution of hydrochloric acid before using a bonding agent. Critics of acid etching point out that the acid must be properly neutralized before being washed down the drain or it can damage pipes, as well as the environment. Minnie Method's proprietary bonding agent does most of the acid etching step.

As the bonding agent on the Minneapolis' tub sets, Apex slips on a Tyvek suit and straps on an air mask connected to a ventilator so that he does not inhale paint vapor. Using a spray gun, he applies three coats of acrylic urethane enamel, letting each dry for 15 to 15 minutes. With the help of a heat lamp, the finish cures in about one hour; a wet sanding with 1,600-grit paper smooths lumps and rough patches. After he does all the surface work with paper, smooth, he goes over it with a power buffer equipped with a foam pad and some water compound to remove any scratches. Finally, he hand buffs the tub to a shiny finish with a soft cloth and polycarbonate glass car wax. Eight hours after setting up at the Minneapolis' house, his work is done. They'll be able to slip into a bath here that night.

Minnie Method, like many refinishing companies, offers a five-year warranty. But says Duane that Minnie, as owner of the franchise that refinished Jackie's tub, with proper care and maintenance (nonabrasive and bleach-free cleaners only), a refinished tub surface should last 15 to 20 years. And while that's a few years short of the five decades you can expect from new porcelain, it sure beats buying a tub that will never be horizontally surfaced. ■



The glowing post-finish on the Minneapolis' 1515 tub should last about 15 years.

GOING AS NEW

Refinishing may be the most practical way of restoring a built-in bathtub, but for those lucky enough to have a removable claw-foot tub or cast-iron claw, the direct fix has long been to give it a new bath. That matches the hardness and durability of the old one. Christine Corrado, Chicago, of Lonsdale, Illinois, is planning a bathroom renovation in a Toronto, Ont. home. She came up there to get her original glossy tub. The process involves sandblasting off the old

finish, then baking on a new enamel coating. It's \$4,000 for about four hours. "It's possible porcelain enamel, the same glass coating used on bathtubs you buy in stores," says owner Ron Kopples. Her company has already successfully restored steel sinks for about \$250 to \$300. (Cray markers, like ballpoint and gelball pens, can't be refilled.) The cost to treat a bathtub should range from \$600 to \$1,000, depending on its size.

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the details

BY LIZ REYNOLD

There is no happier sound than the pitter-pitter of little feet—up to a point. When the pitter turns into thunder, and little feet (as well as big ones) begin to leave scuff marks on the stairs, it may be time to install a runner.

Prior to the mid-19th century, when high-powered looms were invented that could roll carpet out in bulk, a rug was considered too precious to risk upon stairs. Rugs, imported from Europe, were expensive, most were placed on tables. Soon thereafter, however, stairs began to be covered with reversible strips of ingrain carpeting that displayed intricate patterns on both sides. Today, most runners come in 25- or 27-inch widths and in a wide variety of patterns; the choice depends on how much of the stair you want to cover.

Certain weaves work better on stairs than others. Densely woven low-gill or tight-loop carpeting of pure wool or a wool-nylon blend is more practical than that made of silk, rayon or polyester, which wear thin faster, because they do not withstand abrasion well. The most durable—and most expensive—material is a Wilson, because it is woven all of one piece through the backing material. Wool broadloom can also be cut to the width of a runner and bound along the edges. With the right fiber and weave, a securely installed runner should still be going strong, even after the little feet have grown big.

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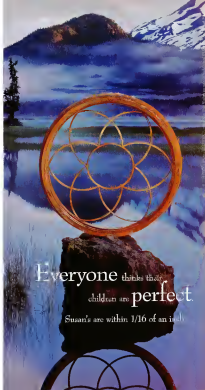
stair runners



For his musical *Bartholomew*'s all-star! "Bartholomew" runner comes in past front or last place—much or without leaders "Golly Polly" singers runner by Family Free Loco Warner is an authentic, last-first-har reproduction. Poly-band "Daffodil Grass" and runner is from Elizabeth Perkins. Musicians' work: Bartholomew's words follow steps through a colorful cartoon way in her cartoon runner: Bartholomew's "Golly," shows in two color combinations, it is a Wilson scene. Last place "Bartholomew" is from Louis de Fontaine.

Rods and Clips

Even though a size number is printed and glued to wood hairline slings across every name, mostly a broad line plays by (see on page 18) many curled hairlines underneath the use of steel rods or clips for additional support—as well as for decorative interest. (I'd note some with three pieces, the tubing, a pair of supporting brackets, each of which is screwed to the hair and head, and finally to fasten them off. Hair clips like those from Deborah and Stark Group were used during the Victorian era. They are fixed in place, then pivoted to slide over the volume of the number.)

[illegible]

Young Valley
 December 1904

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PADDED ATTRACTIONS

Choose a thick padding, or underlay, to help extend the life of a runner, rather than a thin or overly thin rubberized underlay, which can wear. Be uniform. Some installers employ a trick to increase a carpet's longevity: They fold an extra disc-length of carpet against the bottom stair. When the carpet begins to slip, the piece is unfolded and the entire runner is pulled up and repositioned to distribute the wear.

Step-by-Step-by-Step

To calculate the length of a runner for a given set of stairs, such as those in a house in Water Mill, New York, measure a tread, multiply by the number of steps, then measure the riser and multiply again. Add the two figures together; then divide by 2 for more as a margin for error. Extra padding will be required if there's a dramatic turn and if there are any landings, factor in the length of connecting hallways, if necessary. A stair runner needs to be checked periodically to make sure that neither the staples or tacks (nor the nails or clips that hold it in place, if any) are coming loose. Because of foot traffic, a runner may require a little extra vacuuming to keep it looking neat; the edges are notorious fluff-catchers.

1. Carpet installer John Crenshaw needs a "backlash" where the tread meets the riser. The backlash is a strip of wood with teeth like "poking pins" that push the runner and help hold it in place. (You come to several lengths, depending on the thickness of the runner.)

2. Crenshaw measures, cuts, and staples pieces of felt-like wool-pile padding to each tread, leaving the backlash exposed.

3. After carpet is installed from the bottom up. Using a hammer and claw, Crenshaw drives a line of the mallet from Woodard Wood, into the gap between the floor and the bottom stair and then staples it in place.

4. A kind of glue glue for each tackless further secures the runner as it is stretched near tread and riser. As installation progresses, Crenshaw pushes a couple of staples into the edge of each tackless and a row of staples under the nose of each tread to finish the job off.

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by Capt. James J. Wiggins (Rev.)

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LETTER FROM

THIS OLD HOUSE

Practical Design

BY NORM ABRAM

Ten years ago, when I started planning the house I would build, I chose a traditional two-story Colonial, a style that fits perfectly among the historic homes of my open Boston suburb. With its steep 9-inch 12 roof pitch, cedar roof shingles, and wood clapboards, it looked exactly like what I had come to consider, after a lifetime in the Northeast, to be a classic, old house.

But the design actually evolved over many years, and the first Massachusetts writers discovered which building methods made sense out of the shingles, materials, and—most importantly—style. Over time they exchanged decades worth of study, wood, and, given their steep pitches, so tough off the heavy piles of snow. Their tightly spaced wood clapboards were never to make it as fast as the, and did just as good a job of shading out the sun. These wood houses, which were born of necessity, looked little like the chiefly masonry ones the colonists had left behind in England, but it didn't take long for them to dominate the new colony.



View of the Santa Barbara project, where old details meet with new materials

Just Windsor's California bungalow is quite different from my house, but California houses like hers were also shaped by the factors they needed to serve and the materials at hand. The style's low-pitched roof and deep eaves may be interesting to look on, but they were intended to shade the inside of a house from the hot sun and allow the occupant to catch a breeze without ever coming living spaces. On many bungalows, finely crafted interior and exterior woodwork celebrated California's native industry, which seemed to be in endless supply in the early 20th century.

These house forms continue to be modified, influenced by our growing understanding of how to light—and serve—the various rooms. As contractor Steve Crawford works to bring the Arts and Crafts style into the 21st century, he is trying to revive original details while incorporating new materials and construction techniques that developed in the last century in response to natural disasters and our concern for environmental issues. He's replacing wood shingles on the side walls with cement tiles and those on the roof with fast-track asphalt to meet local codes that address the fire suffered regularly in Santa Barbara's hills. And the trees on the street and around the windows will be made from an environmentally friendly composite wood material rather than old growth redwood.

But Steve's not rejecting tradition; he's taking part in its ongoing evolution. Perhaps you say that there's no place for cement shingles or new-fangled lumber on a Arts and Crafts house, but 100 years from now, when all Santa Barbara houses incorporate these elements, they'll most likely be considered an essential aspect of the style—just as I regarded the pointy wood roof as a vital feature of New England architecture when it had dated the landscape for two centuries. As we've learned over the years, building a house is that a rare advantage of technological advances and design as environmental care, but, in wood, stone, or brick, or steel, doesn't have as conspicuous an impact. It will most likely drive it to new heights. ■

PHOTOGRAPH BY SHELLEY METCALP



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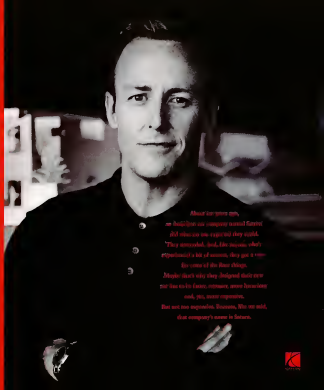
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BIG ONE

BY HEILSON HANDEL

Contractor Steve Crawford didn't expect to unearth a code-perfect concrete foundation under Jan Winford's house. This Old House's latest winter project. But what he actually found—a 60-year-old mélange of unreinforced concrete, crumbling old brick, and hollow clay tiles dug just six inches into the ground—left him stunned.

"Most of the footings were either dust, or nonex-

istent," he says, eyes bugging out of his head. He doubted they would support a house of cards, much less a new second story.

Crawford and architect Jerry Zimmer quickly conferred. Their solution? Dig out and re-pour about eighty percent of the foundation.



Even the decorative pillars that grace Jan Winford's front steps get earthquake protection from Steve Crawford's crew (A207). Before being cut into the four corners of the hollow concrete block dramatically reduces the pillar's strength, so it will be less likely to break when the earth moves.

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SO YOU THINK YOU'RE SAFE?

For instance, headfirst, upside-down: they're the risks people take in the Southeast. Collapsing is today's dilemma. That Weather Haven's factor isn't confined to the West Coast. According to the Federal Emergency Management Agency (FEMA), there have been more than 1,000 major disaster declarations in the last 35 years, no state has avoided the inevitable. Almost half of these disasters are floods, and nearly one out of seven are hurricanes or tropical storms. Earthquake activity for only one of seven hundred states in Europe.

The shear force of high winds is similar to some of the forces exerted during an earthquake. If there is a major storm, don't knock a house down, a window or door failure can cause pressure changes that literally blow a roof off from the inside. Unlike quakes, in which the destruction done is unpredictable in distribution, winds are and floods are concentrated along an axis or basin.

"You can build a wind- and flood-resistant house," says Professor Michael K. Goebl, a geologist at

Queens College, in New York City
 "Was everything is withheld from the translation to the rest, a heavy side as one evil and noble there pulling back."

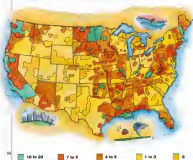
In other words, the same technology that most frequently attracts criticism could easily be placed within a framework. And those methods don't just apply to general construction: Providing excellent sites offers the reinforced design a real or sliding replacement job of traditional reinforced concrete. Building or tying a house to the foundation is more expensive, but not by much of any kind. Mixed preference is even more costly, because it usually involves clearing the house to the ceiling in the structural shell.

Each column is covered by Gerbrüder, with three 200-pole depth winds, all beds are off.

"Hagen and Andrew want to kick-up polls for rural potential businesses and do in developed areas," Geoff says.

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pare, the battle is over you win."

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To help insure even settlement, lateral load design must build the structure securely to its foundation as well as to reinforce the critical framing connections, from the sill up to the rafters, with something stronger than the studs used in framing. A structural engineer specified more than a dozen different types of galvanized-steel connectors for Jack Hargrave. One, called shear ties or the L-shaped steel brackets, nailed along the studs, then secure the braked sill to the studs, and the studs on different floors to each other. They help to redistribute the lateral forces caused by any one gust as the house wall moved into shear loads in the foundations, the part of the house meant to secure the loads.

On new construction, connecting hold-downs is reasonably straightforward. Crews can use the concrete subcontractor's form, Bruns Blows, took 2 1/2-in.-long, 2-in.-thick steel angles and stuck them 8 inches deep in 32-in.-centers into the fresh concrete to make new sections of foundation was poured. Crews simply can slip the old plant onto these bolts, fix them the hold-downs to them, and then bolted each hold-down to doubled tracks. Between the first and second stories, parts of the hold-downs—only one the first floor in this case, the other near the second story floor—were bolted to each other and to their respective tracks. And whether a wall moves in, later, and leaning against them reinforced the connection, says Levee's chief engineer.

Once these steel ligaments were in place, Crowford stacked the walls in 2-inch plywood. When attached to the permanent wall to the south in between, these stiff panels create a rigid shear wall that, together with the build-downs, keeps the south from rocking and collapsing in an earthquake. For extra insurance against buckling, Crowford also makes sure the plywood sheathes the distance between the first and second floor.

These components of burial-loot construction can also be reutilized to a house, such as existing foundations. The scope and complexity of these projects varies, depending on how a dwelling is constructed and how much of the housework is exposed during a renovation, but most reutilizing in Colima use components on the foundation. Only a small portion of Jan's house was sufficiently small to be reutilized; the rest of the house provided a new poured foundation—16 inches wide, 18 inches deep, and laid vertically and horizontally such that it acted as:

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High speed rail guidelines indicate the programmatic flow chart. The U.S. Department of Transportation will release the final guidelines in the near future.



Following treatment, these groups were also
 observed. (Revised by Laura Conner)



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Steve Pollard of Brian Foster Construction did the retrofitting work on Jan's bungalow. Using a rotary hammer, he drilled 7-inch-diameter holes for the 9-inch-long, 1-inch bolts through the sill plate and into the old foundation. Retrofitters typically use two types of bolt: expansion bolts, which, as their name implies, expand when tightened, grouting the foundation, and chemical anchors, which use bolts set in epoxy-filled holes. Both types have sufficient shear and tensile strength, but on older foundations, where the pressure applied by an expansion bolt may crack the concrete, chemical anchors are preferred.

An epoxy bond becomes as much as one-third stronger when it's set in a dual-lure hole. Pollard cleaned out each one with compressed air and a caustic nylon brush, then filled it about halfway with epoxy and moved the rest into place. Dividing a chemical mix by air bulb (the one that can compromise the connection). Pollard mixed a mixture

of 10 parts of the epoxy to 1 part of the hardener. For full-strength, the mixture must be mixed in a 10:1 ratio. For full-strength, the mixture must be mixed in a 10:1 ratio. For full-strength, the mixture must be mixed in a 10:1 ratio.

of 24 hours for the epoxy to harden before tightening a washer and nut onto the bolt protruding through the sill.

In top view of the results, after the walls were up, Pollard drilled wooden spacers into the double studs. He bolted the full-down on top of the sill plate and into the foundation, then horizontally through double studs. (Where there isn't room to drill vertically, Pollard uses levers that

wrap over the sill top and are inserted through the foundation wall.) Two weeks and four tracks of concrete later, Jan is standing atop the first part of her house to be built back up after weeks of demolition. The galvanized endosteal straps glow in the sun, but her house's guardians against the next earthquake. "If you don't have a good foundation, it doesn't matter what you do cosmetically," she says cheerfully. "It's like dressing up a pig. It'll be pretty, but you'll still have a pig." ■



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CARVING OUT A **KITCHEN**

An old garage makes way for an expansive family gathering place

The stately white clapboard-clad farmhouse on the banks of the Blackberry River in North Canaan, Connecticut, seemed everything Joe Poindexter, a writer, and his wife, Holly McNesly, a graphic designer, were looking for in a country home. With its generously proportioned rooms and wide-plank pine floor boards, "there was something very elegant about it," McNesly says. Not to mention historic: The main section of the two-story Colonial dated to 1754, when it was

BY CYNTHIA SANZ
PHOTOGRAPHS BY MATTHEW BENSON

the family home of Samuel Forbes, a local "vine hunter," who was passionate with Revolutionary War hero Ethan Allen. "We loved everything about it," Forde says. "Everything, that is, but the kitchen sink. 'Holy hand the sink. It was black, and we thought—well, a sink will be easy enough to replace.' Painters' plan." That was the error of our original scheme."

But, as the couple continued working with, making changes, balancing walls, and removing old plaster, they realized that the house needed far more work than they had anticipated. "With old houses, once you start opening up the walls, you find all sorts of things you don't want to lose," McNelly, the owner of a Brooklyn, New York, brownstone restoration, rustic-style saloon. "Then we began to look at the back of the kitchen, and to think about what else we could do with it."

ABOUT THE KITCHEN: Although the kitchen seems a little out of the first door, it follows a gaffly plan in the cooking zone, with the range facing the refrigerator and sink. The door at one corner shows the dining room. **BELOW:** The new stainless-steel sink is an undermount undermount model. **BELOW:** Plans for a kitchen "before" (plans) illustrate how the space occupied by the former garage was incorporated to form a new entry and large mudroom.



With the guidance of architect Tim Beathorn and a local builder, Ray Over, the couple came up with a scheme that went way beyond the kitchen sink. Besides correcting all the structural problems and modernizing the existing 1960s-era cooking area, the project, budgeted at \$200,000, called for moving down an attached garage, storage area, and half bath to make room for a sunny breakfast room, a back entry/mudroom with a new half bath, and a screened porch capped by a cupola. The design also included the replacement of a back porch, and a free lift for the old working fireplace. And a future terrace.

The trick, Beathorn explains, was to register the addition so that it wouldn't clash with the clean lines of the old house. "You don't want it to feel as if one part of the house is 18th century and the other 20th century," he says. With the design in hand, Over laid out the structural issues, such as how to straighten out the crooked walls. "Over the years, the old house's wall under the sink had completely rotted out," he explains. "The house started falling off the wall, and eventually it just broke loose and tipped out a bit." To make matters worse, previous owners had continued to add on to the house despite the misalignment of the outer wall. "They just secured the wall where it was and kept on going," Over says. Inside the old kitchen, the wall bulged noticeably.

After replacing the sill, Over said his crew shored up the wall as best they could. "Without raising the structure and starting fresh, we could not straighten it or the wall appears a mess," he admits, but the crew shored up the exterior frame to disguise the inconsistencies. Equally tricky was the redesign of the back entrance. After tearing down the attached garage, Beathorn reconfigured the space that had formerly housed it, along with a half bath, and a storage area, and then moved the back doors where the garage door had been. The door now opens to an entry/mudroom, with a new, larger half bath and a previously-undiscovered closet off it.

The far half of the new addition became the breakfast room, which adjoins a screened porch where a herbaceous yard is used. "The breakfast room is turning out to be one of the most comfortable places in the house," Forde says. Rather than being beneath a rumbled-invasive floor keeps the first story when the weather is damp or chilly.



ABOUT THE KITCHEN: Although the kitchen seems a little out of the first door, it follows a gaffly plan in the cooking zone, with the range facing the refrigerator and sink. The door at one corner shows the dining room. **BELOW:** The new stainless-steel sink is an undermount undermount model. **BELOW:** Plans for a kitchen "before" (plans) illustrate how the space occupied by the former garage was incorporated to form a new entry and large mudroom.



SOUND SURROUND

To integrate the existing fireplace into the new kitchen, architect Tom Brothman designed a paneled chimneypiece in cherry, which is accented by a soapstone and granite surround and hearth. West Lane and Chris Polanco of North Street Furniture Shop fabricated the paneled and milled in two sections so that it would look like one wrap around 2-inch-wide rebars (joint cut) at the third corners of the chimney. The lower section, composed of two solid

cherry legs and a lining inlayboard, went on first. The area used brackets to join this to the upper panel. A milled shaft, which had been hollowed and glued in this panel in the shop, takes the stress between the two. The frame around the soapstone was milled and milled in the shop, leaving just detail work. More was added on site to finish it off. Finally, narrow crown molding was nailed along the ceiling line, to bridge the gap between it and the upper panel,

Closing off the old brick duct allowed Brothman to replace a narrow service's stair with a wider, steeper one that is accessed from a large new stair hall behind the kitchen. "It used to be that you'd have to enter the back stairs through an out-of-the-way door, because the owners then wanted their service to be inconspicuous as possible," builder Ray Chen says.

Once the structural problems were solved, Brothman tackled the details of the kitchen. He altered the short leg of the L to create a bar area. The longer leg embraces a 48-inch soapstone-topped peninsula ring that features two ovens, an island, and a center grill, opposite, on the outside wall, is a 30-inch-wide refrigerator, with its freezer on the bottom, a dishwasher—and a gleaming replacement for the old owners' old sink—a new, under-mount stainless steel double bowl model.

Working carbon, of Vermont soapstone, around. Along the range and bar walls, the soapstone is also used as the backsplash, which runs all the way to meet the wall cabinets. In the bar area, there is an auxiliary sink, a second refrigerator tucks under the counter. This fridge is a gadget, as Holly McNelly's eyes. It controls the traffic flow throughout the room. Now McNelly and Pendergast's teenage sons and friends can grab a drink without making all the way through the cooking zone to the large refriger-

ator, which was not relocated. An open-faced cabinet, attached to the wall over the bar sink, is a formal cherry and filled with glass shelves to showcase and store barware.

Integrating the local old brick duct fireplace into the new kitchen design posed its own challenge. The chimney led behind into a closet and half bath. "The idea," Brothman says, "was to create a special sort of 'inglenook,' where, when people come for drinks, they can have a glass of wine while Holly and Joe are cooking."

To hide the brick, Brothman designed cherry paneling and a fireplace surround made of Vermont soapstone and granite framed by cherry molding. The wood complements the cabinetry while the soapstone matches the countertop. (The sides and back of the chimney are hidden by paneled Sheetrock.)

Now that the address is complete, the family is looking forward to spending their five minutes in their remodeled house, especially now that they have so many comfortable spots where they can gather together. But, that doesn't mean they will have less of time to relax. Plans for a pool house and terrace, and a landscaping scheme, are testimony to the fact that a remodeler's work is never done. "We're far from the home," McNelly says with a laugh and a shrug, "but how often are you as many outdoor dreams to be made?" ■

An important feature of the new address is the way the kitchen opens into the living room—and is a natural part of the design. The three spaces along with the dining room, offer open and appropriate for family and friends to gather—and eat—together. The design was purposely kept in a minimum.



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a tale of two stories



When the owners bought the Hampton Bay house, the building had just one and a half stories (left). A redesign gave them a manly second floor for two quiet rooms. A small back garden helps create a buffer between the nearby roadway and the house, and furnishes the entry to the kitchen, which is the one most frequently used.



BY KIMBERLY STEVENS
PHOTOGRAPHS BY ANDRÉ SAKAWSKI

Max Salvatore loves to have a good time. And he especially likes to tell a good story—in fact, it was his passion for local legend that drew the New York

businessman to a 2,000-square-foot "beach shack" in Hampton Bays, Long Island. Nestled among old maple trees off a winding road dotted with farms

and fields, the house was once the weekend haunt of Jack Krandler, an original co-owner of New York's "21" Club, a famous speakeasy of the Prohibition Era (now a restaurant).

Max and his wife, Diane, fell for the place right away. "The house is just oozing with history," says Salvatore. "I love to think about all the wild parties and fun times they had back then." Colorites of the '30s—like Arthur Froscher, Jack Haley, and Ralph Bellamy—spent weekends at the property. Balboa he hit big. Krandler owned a series of saloons, pieces of



saloon. One of its original customers of New York City's "21" Club spent weekends at the house until he died in 1940. The property owner discovered the remnants of the club's former owner, The Famous Grouse, in the basement. He decided to add on to the house's historic authenticity. A plaque reads: "The Club House At The Sea."



ABOVE: Six terrace windows replaced the plate glass windows in the old parlor (right). The custom-built ottoman is painted in a contrasting color to the walls to draw attention to the fire carpeting; the dishes are slightly deeper than average to hold the TV and other objects. The dentist fireplace mantel (below) is in keeping with the home's classical style.

which were stored in the house. Substoner eventually unlearned them in the basement.

When the Substons bought the place, the right-acre property included the primary house, two guest houses, a swimming pool, a Roman-style bathroom pavilion, and a tennis court. Though it was dominated by sweeping water views of both the Cayo Francés and Mosquito bays and buffered on one side by land owned by the Mosquito Indian tribe, the main house didn't live up to an spectacular location. Over the years, it had fallen into minor disrepair, and walls had been torn down and rooms added on without much attention to the structure or style of the house. It had a large kitchen, a living room, and a sunporch, but only a couple of small bedrooms. An attic space was being used as a spare bedroom. It was clear to the Substons—who have four grown children and six grandchildren—that a renovation would be needed to accommodate their growing family.

The remodel, realized in a winning collaboration with the help of architect Cameron Cameron & Taylor Design Associates, of New York City. "We tackled a traditional house that seemed spacious and better categorized into the 1950s," says Vicki Cameron, a partner at the firm. Because the Substons wanted, for present reasons, to maintain the footprint of the house, the plan added two bedrooms and a bath in a 1,400-square-foot second story. The architect also gave the sample house a richer presence by embellishing it with a number of details. They crowned the roof deck, above a long expanse of windows along the master suite of the house, with "Crescent Chippendale"-style railings inspired by those at Monticello. They dignified the kitchen entrance—the one used most frequently—with a classically styled parterre surrounded by a small herb garden.

Even with all these changes, says local contractor Walter Case, at Walter Case Construc-



SMOKE AND MIRRORS

According to builder Walter Case, it isn't unusual for old homes to have "topping chimney syndrome." Trying to perfectly center a chimney on the roof proved a little challenge for many nations. After the house location didn't turn out good, a master might simply build the chimney at an angle. In this case, the masonry crumbled, or slumped, the chimney 20 feet over 1 foot of height, causing it to lean at a 20-degree angle. During the construction of the second story, the chimney raised in. It was completely rebuilt starting at the second story.



STAIRS

The architects carved out a niche for stairs to link the new second floor to the existing house. The staircase was built off site, delivered in four pieces, and installed into the space "to within an inch of its life," says contractor Cass. An essential structural support for the staircase—we didn't feel disrupted as a client—required visitors to pass through the staircase while waiting for the interior to be finished, a fact (we're) pointed temporary support.



The old area was given over to a new guest room to create a true second floor with two guest bedrooms and a shared bath. Large patios link each bedroom chair and a sunroom, and each was designed with French doors leading to outdoor decks with views of the water and grounds. "We wanted to continue the fun, playful feel of the house exterior," says Cameron. "I wanted it to feel like you could walk right out into the tropics." But, she adds, "it was also important to create spaces where guests could spend time away from the group." Thus the bedroom overlooking the bathroom was designed with an enclosed porch to shield it from activity below.

ABOVE: A guest room on the second floor is painted a bright shade called "Mango Lovers"—a color that the architect chose to match.

During the renovation, Cass and the team designed features of the second floor's new playroom for her grandchildren. A screened door to the landing leads to a space under the eaves that was transformed into a child's dream bedroom, complete with a small window, bed, and air conditioning.

As the architect dramatically redesigned and updated the existing interior to harmonize with the new construction, one of their biggest challenges was the graceful integration of a staircase. "We had to weave the stair into a space that previously contained a small closet and an old-fashioned ship's ladder," says Cameron. (The ladder was used to reach the attic space.) A column with classical details that runs through the stairwell serves as a support for the winding staircase, it is essentially an extended spiral post. The need for such an element "presented an opportunity for an architectural reference," says Cameron, but it also serves a symbolic function. "It was important to show that the steps lead from the basement, where we excavated a lot, to the guest room upstairs," Mr. Salazar says. "It makes visitors feel the whole place is available to them."



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On the main floor, the architects replaced the dark wood paneling and exposed beams with clean walls and classical trim, and moved the old brick fireplace surround to the living room with a simple wooden mantel with Colonial Revival-style details. Because Mrs. Salvores loved the look of the old wavy paneled glass windows, modern salvaged as many as possible and mended them with new panes in the six-over-six windows. The original white-painted oak floor was sanded and refinished to its original finish. In both the sunroom and the first library, custom-built shelves and cabinets add pieces of interest to the otherwise simple spaces. And the stairways were enlarged, some fitted with glass-paned French doors, to open up the interior.

The kitchen, which once had yellowing "Tropicana" linoleum and floppy pine cupboards and walls, probably inspired the most striking makeover in the house. (A few original details remain, including a large cupboards.) Custom-built maple cabinets were installed, along with a warm maple floor. "The whole kitchen has the look and feel of a luxury," says Cameron. The room now crackles with beauty to the walls that Louisa Capes, a restaurateur of French pastries, did on the cabinets. Capes, armed with no measure of fine linens and oranges, created a subtle green pattern along several different shades of green. Concentric circles of "Wild Rose" granite, which has a pale green background and speckles of pink, compliment the rose garden just outside the window. The backdrop is a head with hand-crafted ceramic tiles opening a colorful crackle glass in the Arts and Crafts tradition.

All the colors in the house, in fact—soft hues ranging from creamy yellow to soft blue and green—were chosen to coordinate with the overall elements of the property, from the trees and gardens to the house. "The colors in a house that are chosen from nature can create seamless movement from the outdoors to the indoors," says Cameron.

Mrs. Salvores raises about the house and the grounds and the guest cottage. "This whole place is a work in progress," he says. "On any day, it was all about painting and having a good time," he adds with a smile. "With my family and friends here all the time, I guess I'm creating my own holiday all year." ■

The master bath on the first floor was expanded to encompass a stone shower and a double vanity with a window that overlooks a private garden. The bathroom's powder room floor was tiled with black-and-white limestone from India.

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As any home-improvement expert will tell you: Wood and water don't mix, especially in the bathroom, where humidity levels are notoriously high. For years, builders and contractors have been understandably skittish about using wood for anything other than vanities—or for accent trim—because, improperly treated and maintained, it will warp, crack, and rot in a moist environment, where condensation occurs.

Nowadays, however, thanks to better ventilation in the bath, an increasing preference for enclosing the steamy shower in a separate stall, and improved finishes that prevent water absorption, the bathroom—and especially its splash-prone tub surround—is less vulnerable to fluctuations in humidity and moisture build-up. Taking their inspiration from Finnish saunas, Japanese soaking tubs, and other bathing spaces that feature wood, many architects and designers are specifying moisture-resistant species, such as teak, or panels that are treated to repel moisture, or painted. Wood has a natural appeal and adapts to most any style of baths, from the most formal, library-like sanctuary to a rustic, casual log-home retreat.

A 7-foot high arched door stands at one end of the arched shower stall and, as addition to providing ample storage for the bathroom, functions as a privacy shield and room divider between the bathtub and the adjacent bedroom. The deep stain is part of the wooden surface for growing side or plant.

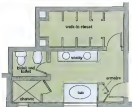


A contemporary, yet classic appearance is what Tom and Betty Soukphix were after in the master bath in their home in Tucson, Arizona, (shown here and on the previous page). To this end, they couldn't imagine using any other material for the cabinets, mirror frames, and bath surround but wood. When Tom had asked Betty to describe what her dream bath might include, her wish list led off with lacquered wicker, a wood chair supports a sense of relaxation and formality—a look that would differ from other baths in the house.

Other coveted items included a cast-iron tub-in-cabin bathroom suite, a separate room for the toilet and bidet, a towel warmer, and plenty of storage, both in the bath itself and in a separate walk-in closet. Tom's specific focus on the shower. At 6 feet 4 inches, he wanted one that was large enough that he would not bump into its walls when leaning up, and with a shower head high enough to enable him to stand up straight when craning off. He was also very particular about the fittings. "I had always been a love-it-or-leave-it kind of guy," he explains, "so that's what I chose."

To achieve the relaxed and elegant atmosphere Betty was after, Tom Greenwood, the architect for the entire house, designed every element of the bathroom, including the mirror that stands at one end of the tub and the paneled sheathing that faces it, with the same attention to detail that a cabinetmaker supplies when crafting an individual piece of furniture. "All the millwork was done to reflect back to an earlier time," Greenwood says.

The team (which included the Soukphix, Eric Meritt, the contractor, and Elaine Paul, from Arizona Design Interiors, who assumed direction of the design when Greenwood moved his practice out of state) took a unique approach to the building of the bath, adjusting the concepts along the way, making decisions on site, and mod-



A pair of mirrored 12-inch-deep medicine cabinets were built into the wall on either side of a larger, more elaborately detailed mirror, all, like the bar and dress vanity, were constructed of wood, to visually link all main portions of the bathroom. Lighting fixtures are retro-style reproductions.



ifying plans when necessary. Working this way can be more expensive, but, in this case, the decisions that were made saved money. For example, an originally conceived, the post-and-rail window over the tub was changed several feet from where it ended up. Eric Meritt constructed a partition to seal off the tub, and needed a window to let out a variety of views and determine the position of the current window. Other modifications—which led to reinforcing the mirror vanity—included the installation of a small window in the shower and a tilt-out transom above the door into the room occupied by the toilet and bidet. "Each element of the area was scrutinized to make sure we would achieve the look we wanted before the work was done," Meritt explains.

The dock around the cast-iron tub was a challenge because it was made from a single slab of limestone, selected for its warm tone, which beautifully complements the walnut. Because it is porous and soft, the surface cracked along one of the narrow sections dur-

ing installation. To remedy the damage, the gap was filled with a wood epoxy. There was an up side, though, a piece of stone was salvaged from the tub exterior to create a bench and niche in the shower.

The inclusion of a towel warmer also involved extra planning. Since the couple chose a "hydronic" model that is heated by hot water running through it, plumbing had to be placed before the foundation was poured to prepare for its installation.

Lastly, Betty got her wish for a separate space for the robe and bidet in the design; the two fixtures occupy a 3 by 7-foot room adjacent to the shower.

The completed bath is just what Betty had in mind; it is elegant and refined, incorporating every element she and Tom asked for in the design. And it throws the adage that "wood and wicker don't mix" right out with the bathroom.

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PLANNING A SURROUND

Before embarking on the construction of a hardwood bathtub surround, there are several factors to take into consideration. The most important is the weight of the tub, because this weight (up to 500 pounds) will affect how you support the tub. You will want the tub to be buttressed not only by the framing and the deck, but also by additional, firm support from the floor (see step-by-steps by T.O.U.H. contractor Tom Silva on the opposite page).

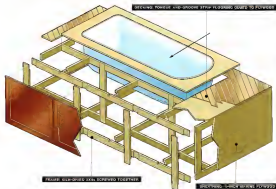
You should also question the amount and type of use your tub will get. A teenager's or children's bath will suffer more splashing than a quiet retreat for a guest of the family. As you measure out the space the surround will occupy, remember to factor in the position of the plumbing that will have to be roughed in before construction begins—plus a step-up, if desired.

Most tubs stand 15 to 18 inches high; whirlpool baths can stand as high as 24 inches. One easy way to get a paneled look on a wood surround is by applying stock kitchen cabinet doors to its face (and sides); in this case, the tub must be raised, to 18 inches. How many doors will you need?

IDEAL In a master bath, the tub was raised to meet the wood surround above. The wood panel surround is supported by an extra-high hardwood that blends in with the one gridding the room. Glass-plate panels protect the wood on the bath and its one at last, where only the step is dark, to reveal the tub's tub.

"The number is based on the width of the door and the length of the tub. 'Four 15-inch-wide doors would be used for a 5-foot tub,' says Richard Dawson, owner of Classic Kitchens & Baths, in Ventura, California, "and three 24-inch doors for a 6-footer." If you have a whirlpool bath, the company adds, install one door on hinges to allow access to the whirlpool motor.

bath in a box, step-by-step



"Building a tub surround to the building is best, upside down," says T.O.U.H. contractor Tom Silva. "You have to use materials and techniques that don't stand up to water."

He makes the framework out of kiln-dried 2x6s. "No water's going to touch it if you build it right"—but he doesn't let it with water plywood, fastens it with stainless-steel nails and screws, and uses narrow strips of quarter-sawn wood flooring for the deck. "You want to use a species like oak or mahogany," Tom says, speaking of the flooring. "They don't expand much in humid conditions." And he makes that water won't reach the wood, he makes all sides of every piece of flooring with a polyurethane finish.

• **MEASURE UP** Using the tub itself or a manufacturer's template, Silva jets down the surround's critical dimensions—the lip's height off the floor, the drain's distance from the wall, the size of the deck opening. He allows about 5 to 6 inches for the side deck. "Any wider and the tub will be difficult to get into and hard to clean."

• **FRAME WORK** With materials in hand, and rough plumbing and electrical work complete, Tom begins building the frame by screwing a 2x4 ledger into the wall. He puts this board about 5-inch higher than the actual lip height (minus the thickness of the sheathing and blocking) to allow for underlayment in the floor. For a stiff frame, he uses one-half-inch joists, and he screws everything together to make it easier for the plumber to make future repairs. Once the frame is plumbed, checked for level, and secured to the

deck, he fastens plywood to its top with six 1x6s. Then comes:

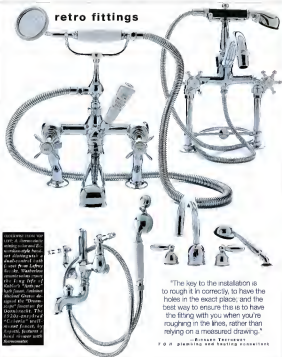
• **GLUED DECK** Instead of nailing down the deck boards, which might give water an avenue to unprotected wood, Tom glues them to the top of the surround with caulk. He spreads the adhesive gun over the plywood with a 5-inch notched trowel and then, to hold the wood in place while the glue sets, tacks through the tongue of each piece with a couple of 1d stainless-steel nails. A slab of caulk on the wall head keeps the water out.

• **SEAL 'N' CAULK** Whenever he brags the ends of the flooring to or the grouting holes for the tub's faucet out, he seals the wood with more polyurethane. "You don't want any exposed endgrain," he says. As a further defense against water, he also presses on a strip of caulk, the kind that comes sandwiched between layers of plastic, just under the tub's lip. "If you use caulk from a tub, you'll have a mess."

• **MODIFY KES** The frame is not meant to carry the weight of a tub, so Tom sets it in a bed of fresh mortar about one inch north instead into a stiff mix. When the mortar sets, the floor, and the frame, will support the tub and its occupants.

• **TIME TIME** As the tub's left for Tom to do is to trim out the exposed side with painting and run a bead of acrylic latex caulk around the tub's perimeter, where lip and decking meet. "Make sure the caulk has a moldbreak," he warns. "You don't want to have all your good work spoiled by a moldy fungus." —Thomas H. Baker

retro fittings



These chrome retro fittings are designed to look like the original fittings from the 1920s and 1930s. The bidet is a classic design, and the showerhead is a large, round, chrome-finished model. The faucets and handles are also chrome-finished and feature a classic, ornate design. The entire collection is made of polished chrome and is designed to look like the original fittings from the 1920s and 1930s.

"The key to the installation is to rough it in correctly, to have the holes in the exact place; and the best way to ensure this is to have the fitting with you when you're roughing in the lines, rather than relying on a measured drawing."

—Richard Tschirmer
F & D plumbing and heating consultant



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HOT TO POT

Almost any place can become a garden—and almost any plant can be cultivated—even when soil, climate, and location seem to indicate otherwise. How? In decorative pots, urns, and tubs—almost anything that has a drainage hole. A vast array of plants can thrive in containers, from trailing ivy, cactus, and sedum to boxwood trimmed into a topiary and dwarf evergreen trees tamed by bonsai enthusiasts. Your only limitation is picking the right pot for the right plant. Pots naturally curtail growth, and some plants simply grow too big to be contained.

During last summer's extended East Coast drought, many gardeners decided to cultivate plants in containers; that way they could take care of the plants' watering needs on a daily basis.

Some host plants in porous gravel containers for container gardens. When several together, shapes often look like a single plant. A single plant appears as if it's in a pot. Two all grown together that are trained and shaped can be used as a single plant, and make for a great display.





TOP: Terra-cotta pots planted with hot peppers enhance a porch entrance. **BOTTOM:** Pots along a path draw the eye into the garden.

Of course, a drought is not the only reason to have a container garden. Growing plants in pots is one of the easiest ways to garden in a limited area, or in a situation, such as an apartment terrace, where cultivating in the conventional manner is out of the question. Container gardening allows you to create miniature landscapes within a larger setting, or to enhance the look of a patio or deck. And, for the cook who dreams of a potager, or vegetable garden, herbs, hot peppers, lemons, tomatoes, and other nontoxic vegetables can be grown in pots to yield a crop right outside the back door.

Another advantage to potting is that it enables you to nurture species that could not otherwise tolerate the climatic conditions of your area. Pots also allow you to extend the growing season, since plants, such as herbs, grasses, and shrubs, will survive all year round in containers. Potted plants need water placed outside, and brought indoors during the winter; tropical plants such as palms, miniature orange trees, and fiddleleaves will thrive almost anywhere—even in a region that receives its last snowfall in April. In a cool, high-precipitation area like the Pacific Northwest, sun-loving plants such as lavender can be potted and grown outdoors in warm, protected spots. Hot, arid areas of the country can embrace cool plants favored by ferns, impatiens, and coleus collected in venturers set along the north side of a house.

It isn't necessary to spend thousands of dollars on antique or custom-designed pots to create a handsome garden. Shape, color, the scale of a plant relative to its container

Container gardening is a way to create miniature landscapes within a larger garden setting.

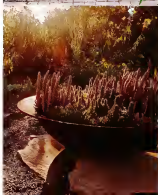
and the way together to their immediate surroundings, as well as a plant's growth pattern, all determine how the container garden will look. Before getting started, ask yourself what types of plants and how many of them you plan to grow. How fast will they become root-bound and need to be repotted? Do you want to give each plant its own pot or will you group several of the same species or a number of different types of plants in one container? If you'd like a burst of color, for example, try potting tomatoes and marigolds in the same tub. Will you choose a number of pots together? Will they be a variety of sizes? And, will they be made of the same or different materials?

Containers of the same size look best when they are set side by side in a strict row. Those of different sizes need to be positioned so that smaller plants will not be dwarfed or obscured by their larger or bushier neighbors. One way to suggest the height of pots, you can intentionally alter the height of a container by opening an empty ear-drain mouth it. You can also support potplants into the scene, whereas blocks or base stone columns are two choices. Some pot schemes play off color and texture—a viney plant looks most attractive when offset by a soft-leaved container, such as a moss-draped terra-cotta pot.

Terra-cotta is the traditional material for garden pots. Terra-cotta's porous texture helps prevent roots from becoming sodden from accidental over watering, or heavy rain. Glazed pots hold water in the soil longer to retain during hot spells and introduce more color into the garden scheme. Plants that need less of water, like ferns, thrive better in plastic pots.

When planting a large shrub or tree, many gardeners turn to cast-concrete containers, which handle all types of weather well and can be left outdoors throughout the year. Cast-concrete containers, long associated with gardeners, are painted to prevent the pot from staining. Unless a container—of any type—is set directly on the earth, it is wise to place

newspaper, straw, or dirt between the container and the ground to prevent the pot from staining. Unless a container—of any type—is set directly on the earth, it is wise to place





Potting A Plant

1. Choose a pot that is two inches wider and deeper than the original pot. Before transplanting a plant, wash it in this blue solution, place a few potting shreds or a piece of liner mesh material across over the hole in the new pot. Gently knock the dirt mass out of the original container. If root bound plants are tilted around themselves, gently leave roots apart as you shape spheres to make a few roots that will allow new roots to expand into the fresh soil mix.

2. Use a soil mix appropriate for your plant; only add sand and/or lime if necessary. [Your nursery can advise you on the mix and supplements you will need.]

3. Fill pot halfway with potting mix, moisten soil.

4. Position the plant so that the soil line will be equivalent to that in the original pot. Don't place the plant any deeper or any shallower than it was before. Add soil, press around roots, and water well.

Leave transplanted plants in a shady area for a few days to allow recovery. Because they dry out quickly, potted plants require more attention to watering and feeding than their in-ground counterparts. In hot weather, plan to water every morning, sometimes twice a day. In the evening, too. Feed with fertilizer designed for potted plants as per the package directions—usually every other week. Some gardeners dilute fertilizer to half strength and feed every week, so this routine is easier to remember.



HOW TO GIVE A POT AN AGED APPEARANCE

For those who like the old-world look of stone-coated terra-cotta pots, stone clay containers in a cool, shady spot need spritzed water for better look than time to time, until more begins to fix the surfaces.

it is an insect to collect extra worms and to keep vermin away from damaging the surface the container stands upon.

Obtaining a plant assumes a complexly different personality depending on how it is potted. The case of composite opposites, a striking plant, such as the spiky cactus on the previous page, will visually cancel the height of an ore, unless spikiness will add a lot of an "edge" to the ore's inherent formality. A row of the same plant type, grown in a long, irregular clay trough, by contrast, may look less dramatic—but will have a fluted appeal. Threading plants, such as ivy or fuchsia, may be allowed to cascade over the sides of a tall or hanging basket, none can be trained to climb up and out of a row of arching pots onto a trellis.

Pots filled with cheerful annuals, such as geraniums, pansies, or petunias, will punctuate a lawn, bed, or path—or a simple window box—with delightful doses of color. To determine where you might want to place your containers, move them around while they are empty, especially if you plan to fill them with plants, such as small evergreens, that will contain in their containers for a suitable period of time.

So, whether you want to experiment with new plants in an established garden, add blooms or greenery to an otherwise lifeless setting, or cultivate success in an existing garden scheme, or enjoy plants in an unobtrusive, discreet, compact garden in the perfect solution to living with plants is a manageable way. ■

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Early American

During the colonial period, blacksmiths forged hardware as they needed it by heating iron and pounding it into shape. Handles were nailed to cabinets, rather than screwed. More uniform cast-iron knobs arrived later in the era.

NORTHWEST IRON PULL

PENNSYLVANIA BUTTER PULL



FORGED IRON KNOB



TRIST PULL WITH RUST FINISH



CAST-IRON KNOB WITH SCALLOPED PLATE



Victorian

The late 19th century saw the rise of ornate, decorative iron pulls.



POLISHED IRON PULL



ACE

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ian

lury saw hardware adorned with ornate patterns, floral
s curves. Cabinet hardware generally consisted of
s and porcelain or clear glass knobs.



ENGRAVED CAST-IRON
BIN PULL

TWO-Piece
CUP LATCH



WORM GLASS KNOB



CUT-GLASS
WORMER KNOB

WROUGHT-IRON
BASTIANE PULL



Arts & Crafts

The span style honored traditional craftsmanship, including hand-hammered
copper metalwork. Even manufactured hardware featured simple lines, such as
handles with square ends and bin pulls without surface embellishment.

SQUARE-ENDED
BIN PULL



BRASS PULL
WITH OIL-RUBBED
BRONZE FINISH



HAND-HAMMERED
PULL WITH
BRONZE FINISH



BLACK BRASS, SQUARE KNOB



INTEGRAL BIN PULL



Art Deco

This modern look emphasized streamlined geometric forms. Materials
like chrome, aluminum, colored plastic, and glass were molded into sleek
designs that celebrated the beauty of the machine age.



STREAMLINED
CHROME KNOB



MODERN GLASS PULL



PRIMITIVE ALUMINUM BIN PULL



MODERN
CHROME
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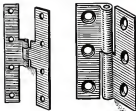


ALUMINUM BIN PULL

The Vanishing Hinge

Although you can buy "period" hardware for kitchen cabinets, you can't replicate what a housewife would have used in her kitchen before the early 1800s—she didn't have cabinets. The kitchen was not a living space that got decorative attention, but a utilitarian room where food was cooked. The knobs on the preceding pages are interpretations of hardware from vintage doors, furniture, and butler's pantries. These sources also offer a host of old-fashioned hinge designs—from the wrought-iron H-hinges of colonial America to the brass butt hinges of the Victorian era—but such traditional hardware styles won't work on most modern cabinetry.

Today's stock cabinets are prefabricated boxes aligned along the wall, typically with overlay doors that either completely cover the cabinet or sit on top of a frame that trims the cabinet box (a face frame). In either case, modern swing-arm hinges fasten to the back of the door and the inside of the cabinet, and are therefore out of sight when doors are shut. Because the hinges are self-closing, doors don't need latches, once a necessity to prevent them from popping open.



The early American H-hinge (left) was wrought from iron and fastened to the face of the door with nails. By the Victorian era, brass butt hinges (right) were screwed to the door's edge, as only the pin showed.

Only some high-end stock and custom cabinets, with doors inset into face frames so they're flush with the cabinet fronts, can accommodate retro hinges. But homeowners who want to give standard cabinetry a period look can do so by simply adding appropriate knobs or pulls.

Tuffy's Euro-style hinges allow installers to locate the cabinet and allow for side frames that provide easy access to the interior inside. Adjustable screws make it simple to align these placement, and a quick-release mechanism on cover cap hinges makes removing and reattaching doors a snap.



knobs pulls

THE
POSTER

The best cooks know that still presentation makes a dish more appealing. Similarly, kitchen cabinets can become more attractive by simply embellishing them with new hardware. Change the knobs for ones with an old-fashioned look, and even plain, modern cabinets will take on vintage charm. Did the Victorian butler just step out? Will the guests be waving darning after dinner?

Iron or brass, wood or chrome, ornate or plain—cabinet hardware comes in enough material and styles to fit any house a decor. You can find a wide assortment of specialty hardware stores and on the Internet. Just keep a few practical considerations in mind. Replacement handles should fit into the same holes as the old ones because predrilled holes tend to show. To stick with the type you have—one hole or two—and the existing placement. And choose hardware according to the age of life in your kitchen. Except in houses where people like to leave mirror knobs will soon doubt with fingerprints. With heavy use, lacquer coatings on brass knobs can wear off, allowing tarnish to form. Square knobs are only intended to look in and don't cut too hard, and need frequent sandblasting to look their best. Most importantly, any hardware you choose should be easy to grab, so you can open a drawer with one finger—perhaps while holding a sprig of rosemary to garnish the dinner plate.



BY JEANNE HUBER

PHOTOGRAPHS BY ERIC PIASECKI



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DIRECTORY



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PHOTO: KEVIN O'NEILL/HENRI



House Calls. No matter how small a kitchen is, if it's well planned it can produce great meals.

OUTTAKES
pp. 18-19

Endless Kwik-Gloss Gutter Systems, Kalamazoo, MI, 616-542-2700, www.kwikgutter.com

Dry Klea Nova DRI 860641 self-adhesive waterproofing membranes, and Micro-DRUM polyurethane drainage panels, MicroDRI, Duluth, GA, 818-464-7214.

HOUSE CALLS
pp. 20-24

Architects: Cantor Cantor & Taylor Design Associates, Brooklyn, NY, 718-852-0347.

Klea Notebook, p. 24

Topary tiles: Ann Sachs Collection copy across, Ann Sachs, 508-278-8453, www.annsachs.com

Waterproofing: W/F B&B Green borders, 110" x 8", 9/81 with golden & green, WTM 4' x 4", 9/23, Country Floors, New York, NY, 212-637-8300; Country Floors, Los Angeles, CA, 310-637-8518, www.countryfloors.com

Parquet tile: Simon's Hardware and Bath, New York, NY, 212-532-0020.

ASK NORM
pp. 28-31

Fire-rated gypsum drywall coloration: Gypsum Associates, Washington, DC, 202-287-3440; www.gypsum.org

National Fire Protection Association, 617-779-1808, www.nfpa.org

Spex-mix foam insulation: Isosync Inc., Ontario, Canada, 905-890-7333, www.isosync.ca

Faux stone: Six screws Industries, San Marcos, CA, 760-736-3232.

Our thanks to R. Ray Sharley Construction, Chelsea, MA, 215-991-3034. Builder: Charles H. Hoagland, 914-714-5733

ENHANCEMENTS: MEADY METAL
pp. 32-34

Metal construction designers: Rumpold Architects, Staten Island, NY, 718-887-1320.

Square Kitchen, Staten Island, NY, 718-351-5378

Kashera by Klenner, Kansas City, MO, 816-531-0968

Neff Kitchens, Brampton, Ontario, Canada, 800-544-3833, www.neffkitchen.com

Allen Curn & Associates, East Hampton, NY, 516-324-7497

Mesa Hardware: Quert Metalworks Ltd., Vancouver, B.C., Canada, 604-255-7771, www.quertmetal.com



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Seaport Inc., Chicago, IL, 312-343-8928, www.seaport.com

EQUIPMENT: CLEANING THE AIR
pp. 38-41

Year head designers and manufacturers: Belharp, New York, NY, 212-966-7183; Faber, Wyland, MA, 508-538-3353, www.faberonline.com

Cheng Design, Berkeley, CA, 510-549-2885

Vera-A-Hood, Richardson, TX, 972-338-6281

Brown-Moore, 800-538-3713

Thermador, 800-656-9226

Further information: The Home Ventilating Institute, 847-386-8138 hvi.org and contains a copy of this directory with product ratings for noise and energy.

TRANSFORMATIONS
pp. 44-48

The Mountain Magnolia Inn & B&B, 828-622-1343, www.mountainmagnoliainn.com

"You're Welcome": The ever-indomitable Mountain Magnolia Inn, featured in an *Ask the Experts* story.



Architect: Juan Gutierrez Martinez, AIA, Martinez and Associates, Asheville, NC, 828-353-4300.

Builder: Rick Kahan, 828-645-3878. Materials: Can Design & Supply LLC, Shelbyville, TN, 531-683-0386; www.candesignsupply.com

WHAT YOU NEED TO KNOW: GARBAGE DISPOSERS
p. 52

Garbage disposers: Model 7755 from In-Sink-Erator, Racine, WI, 800-318-5712, www.inSinkerator.com

FINANCES: MOVE OR IMPROVE?
pp. 54-58

Appraisal: Richard Newburg, Appraisals Unlimited, 617-739-0625, www.appraisalsunlimited.com

Bob D'Andrea, Capital Appraisals, 410-360-6700, www.capital-appraisal.com

Resources: National Association of Home Builders, 202-822-9286, www.nahb.org

MATERIALS: ALL EARN AND NO LITE
pp. 64-66

Cork suppliers: Ardura, Dark Terra Tile, Thin Seng Mason from Esparto Cork Co., Worcester, PA, 800-345-6203, www.esparto.com

Edigo, Miami, Lisbon from Natural Cork, Augusta, GA, 800-484-2675, www.naturalcork.com

Cork Supply USA, Benicia, CA, 800-961-3000, www.corksupplyusa.com

Resilient: Aronson's Floor Covering, New York, NY, 212-243-1993, www.aronsonfloors.com

Information: Envision a moral Home Center, Seattle, Washington, 800-241-9753, www.envisionhome.com

TALKING SHOP: HOW WE'RE COOKIN'
pp. 72-74

Thermador JetDirect ovens: \$5,200-\$5,800, available in June, 800-456-9226, www.thermador.com

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15 厘米宽

[illegible]

1. *Journal of Management Studies*, 1996, 33, 1, 1-14.

908 2223, www.rimadworld.com
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UPKEEP: FRESH FACED
pg. 83-84

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THE DETAILS: TREADING LIGHTLY
pp. 54-58

Page 44: Woodward Woven "Ticking
Serge," design number 8181, hand
woven cotton runner by Woodward &
Greene, New York, NY; 212-348-2304
Page 56: "Remembrance" (solid and



in shades of blue and beige, this striped cotton runner is hand-dyed and hand-finished.

"Cibola" (center right) racoon, star
star, star chips, Star's Carpet, 212-752-
9800, New York, NY, "Golden Paly" dog
ring, ranc, Family Hair Loom: Weaver's
717-246-2431, "Tulford Dog" (owner)
head worn wool canvas, Elmhurst
Edison Inc., New York, NY, 212-628-
1930, Canon elongated (center left) res
net, Star's Hairstyle, Blackwren,
202-773-4913, www.golden.com, "Jera
nail" (bottom right) racoon, Lays of
Phoenix, 800-451-5376 Star ranc, star
chip, Star's nail (JDK) Ltd., for cholester
margin, call 615-376-0600.

Page 88 Carpet installation by Golden Carpets, West Babylon, NY, 610-324-7900.

Interior Design, S. R. Gambrel Inc., New York, NY, 212-264-6113

SANTA BARBARA: BRACING FOR THE BIG ONE
pg. 55-100

Center for Social Control, Carpinteria,
CA 93008-0603

Concrete contractor: Bryn Howe Construction, Carpinteria, CA, 805 686-1636.

Archivist: Jerry Zimmet, Archivist West,
Santa Barbara, CA 931-966-7149.

Structural products, Simpson Strong-Tie Company, Pleasanton, CA, 800-899-5399, www.simpsonstrongtie.com

Fireproof shingles/ Re-Con Building Products, Eugene, OR; 800-347-3373.
Natural Disaster Information: Federal

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ADDITION: CARVING OUT A KITCHEN
pp. 100-101

Architect: Tim Bernhart, New York, NY, 212-901-7615.
Builder: Ray Ortiz and Sons Post and Beam Resources and Restorations, Fitch Village, CT, 860-824-3739.
Fireplace manufacturer: West Laine and Chris Freeman, North Street Furnaceshop, New York, CT, 860-342-6608.

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per rack/oven: \$8700, 980-840-4518;
www.enrichmentbakery.com, 08/20

Booker How to Cook Everything: Simple Recipes for Great Food, by Mark

Krieger, Marmelen Publishing USA,
1994.

Great Kitchens: At Home With America's Top Chefs, by Ellen Weinberger, Colleen McInerney, and Wendy A. Jordan, Thomas Press, 1999.

TECHNOLOGY: REF CHIP
pgs. 78-79

Digital-audio players: Rio 300, Diamond Multimedia, \$249, 360 004 1403, www.rimpo.com. Rio 300, \$270.
Nostalgia 68, Creative Labs, \$280, 800-

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Figure 10.16 *Illustration of a cross-section of a river channel.*



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